Cost Effectiveness Study for a Locally Adopted Energy Efficiency Ordinance for the City of Manhattan Beach

Prepared by:

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Prepared for:

The City of Manhattan Beach Department of Community Development 1400 Highland Avenue Manhattan Beach, CA 90266

Attention: Carol Jacobson, Building Official (310) 802-5525

Issue Date: October 20, 2010

Last Modified: October 20, 2010

Background

In October 2008, City Council formed a resident-based Environmental Task Force (Task Force) to study environmental issues of priority to the community. A Sustainable ("Green") Building Subcommittee was formed and developed a four-pronged approach to sustainable development for the City of Manhattan Beach. Their studies and the resulting recommendations were specifically tailored to the Manhattan Beach's environmental conditions and its largely residential makeup. Specific emphasis was placed on energy efficiency, water conservation, runoff reduction, solid waste reduction and diversion, and air quality and emissions reductions. Among the measures studied and recommended was a policy that would increase overall energy efficiency in the residential sector relative to Title 24 mandates and baselines. Utilizing the services of an energy consultant, the feasibility of this approach was studied and demonstrated to be both reasonable and cost effective.

1.0 Executive Summary

- 1.1 The City of Manhattan Beach has researched and reviewed the feasibility and cost- effectiveness of requiring all permit applicants for new residential construction and residential additions and remodels exceeding 50% valuation to exceed the performance requirements of the 2008 Building Energy Efficiency Standards by a margin of 15%.
- 1.2 Per the criteria stated in the California Code of Regulations, Title 24, Part 1, Section 10-106, Locally Adopted Energy Standards, these local standards shall require buildings to be designed to consume no more energy than permitted by Title 24, Part 6.
- 1.3 If adopted, Ordinance and the Locally Adopted Energy Efficiency Standards shall be submitted to the California Energy Commission for review and approval. The proposed Ordinance and Standards shall take effect only after the Commission has reviewed and formally approved the proposed local energy standards as meeting all requirements of Section 10-106, and the Ordinance has been filed with the Building Standards Commission.
- 1.4 The proposed local energy efficiency standards and implementation have been designed with several key criteria in mind, including;
- 1.4.1 Consistency with the structure, format and calculation methods of the 2008 Title 24 Building Energy Efficiency Standards;
- 1.4.2 Local Building Department review, verification enforcement and field inspection;

1.4.3 Provide flexibility for building permit applicants to comply with the Ordinance by the performance approach using a wide range of building and appliance energy conservation measures.

2.0 Objectives

- 2.1 It was determined that the City of Manhattan Beach shall draft and adopt a Locally Adopted Energy Standard.
- 2.2 Per the criteria stated in the California Code of Regulations, Title 24, Part 1, Section 10-106, Locally Adopted Energy Standards, this local standard shall;
 - 2.2.1 Require buildings to be designed to consume no more energy than permitted by Title 24, Part 6;
 - 2.2.2 Require all permit applicants for new residential construction and residential additions and remodels exceeding 50% valuation to exceed the performance requirements of the 2008 Building Energy Efficiency Standards by a margin of 15% (per Cal Green Tier 1).
 - 2.2.3 Be consistent with the structure, format and calculation methods of the 2008 Title 24 Building Energy Efficiency Standards;
 - 2.2.4 Be specifically tailored and drafted for ease of local building department review, verification enforcement and field inspection;
 - 2.2.5 Provide flexibility for building permit applicants to comply with the Ordinance by the performance approach using a wide range of building and appliance energy conservation measures;
 - 2.2.6 Be analyzed to the fullest extent possible for;
 - a) Cost effectiveness. lowest initial cost(s);
 - b) Feasibility;
 - c) Flexibility.

3.0 Applicability

3.1 The standards and ordinance shall be applicable to all permit applicants for new residential construction and residential additions and remodels exceeding 50% valuation.

3.0. Methodology:

- 3.1 The energy performance impacts of exceeding the performance requirements of the 2008 Title 24 Building Energy Efficiency Standards by a margin of 15% in Climate Zone 6 were evaluated using a range of recent permit applications in the City of Manhattan Beach as Case Study models. These projects were deemed to be representative of those building types typically constructed in Manhattan Beach.
- 3.2 The 2008 Building Energy Efficiency Standards, effective January 1, 2010, were used as the baseline in calculating the energy performance of efficiency measures summarized in this study.
- 3.3 Case Studies were based on actual project designs selected from recent permit applications (herein, "Cases").
- 3.4 To the greatest extent possible and/or practical the Cases were selected by virtue of the fact that they were typical and representative of the building types and lot configurations prevalent to Manhattan Beach.

3.5 Cases: The selected Cases are as follows;

- 3.5.1. 2-Unit Condo: New construction, 2-unit attached multi--family residential (condominium) measuring 5,202 square feet of conditioned area.
- 3.5.2. The Strand SFR: New construction, single family residence measuring 5,557 square feet of conditioned area.
- 3.5.3. East Manhattan SFR: New construction, single family residence measuring 3,137 square feet of conditioned area.
- 3.5.4. East Manhattan E + A (Existing plus Addition) SFR, single family residence measuring 2,742 square feet of conditioned area.

3.6 Base Cases:

The Base Case for each Case is the actual design as submitted including the actual Title 24 compliance documentation for the given project. Note that, in the significant majority of on-file cases, the margin of compliance ranges between 0% -3% for new construction to as high as 8% for additions and remodels.

- 3.7 Where the project data and compliance for a given Base Case pre-dated the current 2008 standards, the project was re-tested and verified for compliance with the 2008 Standards using accepted methodology and computer software modeling program(s).
- 3.8 Each Base Case design was then manipulated by incorporating various Energy Efficiency Measures. These measures were selected by virtue of the fact that they were deemed to be relatively cost effective, readily available, relatively simple to implement and effective as per the professional opinions and with the input of local Architects, Building Officials, Energy Consultants and Contractors. The proposed measures were deemed to represent a reasonable set of measures that accurately reflected how local designers, builders and developers might reasonably achieve a specified level of performance using a relatively low first incremental (additional) cost.
- 3.9 The minimally compliant Base Case designs were then modified to achieve greater levels of energy efficiency by incrementally adding various energy measures and/or combinations of measures so that each Case building exceeded the 2008 standards by 20%.
- 3.10 Initial incremental costs of added energy efficiency measures were established by a variety of research means and with the input of local Architects, Building Officials, Energy Consultants and Contractors to establish first cost data.
- 3.11 Site energy was calculated from the Title 24 simulation results to establish the annual energy savings, energy cost savings and CO2-equivalent reductions in greenhouse gases.
- 3.12 Life Cycle Cost (LCC) studies were conducted for each the Energy Efficiency Measures of each Case.
- 3.13 Note that;
 - 3.12.1 In many instances, highly effective energy efficiency measures may carry little or no additional cost. For example, incorporation of passive design elements such as proper orientation of fenestration, overhangs and thermal mass can increase energy efficiency considerably for no increase in initial cost and reducing glazing area may actually reduce initial costs. However, it was recognized that many residential projects are designed and/or built by non-professionals. Therefore, it was determined that the proposed set of measures used in the study to achieve higher levels of energy efficiency should be such that they can be added to virtually any

- conventional, design with no special knowledge of or skill in the field of passive architectural design.
- 3.12.2 The possible range of measures is essentially infinite and, therefore, the relative costs and complexities associated with implementing various measures will vary considerably. The design choices used in the Case studies this study are based on many years of experience with architects, builders, mechanical engineers; and general knowledge of the relative acceptance and preferences of many measures, as well as their incremental costs. This approach tends to reflect how building energy performance is typically evaluated for code compliance and how it's used to select design energy efficiency measures.
- 3.12.3 Lowest simple payback with respect to building site energy was not the primary focus of selecting measures; but rather the requisite reduction of Title 24 Time Dependent Valuation (TDV) energy at a reasonable incremental cost consistent with other non-monetary but important design considerations.

4.0 Analysis:

4.1 Base Cases

- 4.1.1 2-Unit Condo: New construction, 2-unit attached multi--family residential (condominium) measuring 5,202 square feet of conditioned area. Framed walls are insulated to R-19. Basement retaining walls are insulated to R-13. Two 50 gal. water heaters 0.60 EF. 470 sf floor area insulated R-30 batts. Contemporary design. 37.8% glazing to conditioned floor area.
- 4.1.2 The Strand SFR: New construction, single family residence measuring 5,557 square feet of conditioned area. Less than 12' of ducts in unconditioned space. Furnace 80% AFUE. Retaining walls in basement are insulated. West facing glazing is monolithic. Quality insulation installation & duct testing has been specified These measures require verification by a certified HERS Rater. R-30 Floor Insulation has been specified.
- 4.1.3 East Manhattan SFR: New construction, single family residence measuring 3,137 square feet of conditioned area. No R-19 ceilings. wall fenestration U-Factor = 0.33, SHGC = 0.31. Gas furnace w/ AFUE = 92.

4.1.4 East Manhattan E + A (Existing plus Addition) SFR, single family residence measuring 2,742 square feet of conditioned area.

Assume existing and new fenestration is double-glazed, non-metal, clear glass. Standard gas 50 gal or less water heater.

4.3 Summary of 15% Margin of Compliance Cases with ECM's Added and Respective Initial Incremental Costs

4.3.1 2-Unit Condo:

ECM-6: Quality insulation installation, HERS Required

Initial Incremental Cost = \$675.00 (for 2 systems)

ECM-8: Furnace upgrade - AFUE 80% to 95%

Initial Incremental Cost = \$600.00 (for 2 systems)

4.3.2 The Strand SFR:

ECM-3 Wall Insulation Upgrade: R-13 to R-19 Batts

Initial Incremental Cost: \$150.00

ECM-8 Furnace upgrade - AFUE 80% to 95%

Initial Incremental Cost: (2) units @ \$600.00 =

\$1,200.00

ECM-11 Low Leakage Ducts in Conditioned Space - HERS

Required

Initial Incremental Cost: \$0.00

ECM-13 Eliminate (downgrade) (3) ea. skylights

Initial Incremental Cost: (3) units @ (\$450) = (\$1,350)

4.3.3 East Manhattan SFR:

ECM-6: Quality insulation installation, HERS Required

Initial Incremental Cost = \$150.00

ECM-11 Low Leakage Ducts in Conditioned Space - HERS Required

Initial Incremental Cost: \$350.00

4.3.4 East Manhattan E+A SFR:

ECM-5 Replace existing furnace: 80% AFUE furnace (E) w/

95% AFUE furnace

Initial Incremental Cost: \$1,600.00

ECM-7 Skylight Upgrade (Replace w/ Velux)

Initial Incremental Cost: \$450.00

ECM-9 Attic insulation upgrade: Assumed R-19 (E) to R-30

Initial Incremental Cost: \$1,600.00

4.4 Cost Data & Energy Conserving Measure (ECM) Descriptions and Respective Initial Incremental Costs

- 4.4.1 ECM 1: House wrap upgrade: upgrade from 60 minute paper to Typar or Tyvek house wrap. (Note: This ECM not used)
 - a. Nominal 3,000 sf house = \$560.00
 - b. Nominal 5,550 sf house = \$950.00.
- 4.4.2 ECM 2: HERS Rater
 - a. 2-Unit Condo: \$330.00
 - b. The Strand SFR = \$150.00
 - c. East Manhattan SFR: \$500.00.
- 4.4.3 ECM-3: Wall insulation upgrade: upgrade wall insulation from R-13 to R-19 batts.
 - a. 3,000 sf house = \$80.00
 - b. 5,550 sf house = \$150.00
 - b. The Strand SFR: \$150.00

- 4.4.4 ECM-4: Tankless water heater upgrade: upgrade 75 gal. storage tank water heater 0.58 EF to Takagi or Noritz equivalent tankless (Note: This ECM not used)
 - a. \$800.00 w/ no venting
 - b. \$2,100.00 w/ venting
- 4.4.5 ECM-5: Replace (E) existing 80% AFUE furnace w/ 95% AFUE furnace = \$1,600.00 per unit.
- 4.4.6 ECM-6: Quality insulation: upgrade to "quality insulation" w/ HERS verification = \$200-\$330.00 (HERS raters typically quite a package of services including duct verification, insulation verification and envelope testing).
 - a. 2-unit condo = \$330.00 (2 units)
 - b. East Manhattan SFR = \$150.00
- 4.4.7 ECM-7: Skylight upgrade: replace 11 sf skylight w/ Velux = \$450.00
- 4.4.8 Furnace upgrade 80% to 95%: dual-stage 80% AFUE to dual-stage 95% AFUE = \$600.00 per unit.
 - a. 2-unit Condo = \$1,200.00 (2 units)
 - b. The Strand SFR = \$1,200.00 (2 units)
- 4.4.9. Replace/upgrade (E) attic insulation: insulate existing 1,665 sf attic w/ R-30 batt insulation = \$1,600.00
- 4.4.10 Replace (E) water heater w/ energy efficient upgrade: replace existing 50 gal. water heater w/ new 50 gal. Tank-type 0.61 EF
 - a. \$2,075.00, B-vent, no-recirculation
 - b. \$2,750.00, power vent, no recirculation (Note: This ECM not used)
- 4.4.11 Low leak ducts/ducts in conditioned space: low leakage ducts in conditioned space. Requires ECM-2, HERS rater (see ECM-2).
 - a. The Strand SFR = \$0.00 (duct testing is required in the base case)
 - b. East Manhattan SFR = \$350.00.

- 4.4.12 Upgrade std. 50 gal. storage tank water heater to 50 gal. 0.65 EF = \$188.00 (Note: This ECM not used)
- 4.4.13 Skylight downgrade (elimination): eliminate three skylights @ \$450.00 ea = net savings of \$1,350.00.

5.0 Exhibits (attached)

- 5.1.1 Energy Report, 2-Unit Condo, Base Case
- 5.1.2 Energy Report, 2-Unit Condo, 15% margin of compliance
- 5.1.3 Life Cycle Cost Summary, 2-Unit Condo
- 5.1.4 Energy Report, The Strand, Base Case
- 5.1.5 Energy Report, The Strand, 15% margin of compliance
- 5.1.6 Life Cycle Cost Summary, The Strand
- 5.1.7 Energy Report, East Manhattan SFR, Base Case
- 5.1.8 Energy Report, East Manhattan SFR, 15% margin of compliance
- 5.1.9 Life Cycle Cost Summary, East Manhattan SFR (20 year study period)
- 5.1.10 Energy Report, East Manhattan E+A SFR, Base Case
- 5.1.11 Energy Report, East Manhattan E+A SFR, 15% margin of compliance
- 5.1.12 Life Cycle Cost Summary, East Manhattan E+A SFR

6.0 Conclusions

Regardless of the specific building design, and/or occupancy profile, the incremental improvement in overall annual energy performance of buildings in exceeding the 2008 Title 24 Building Energy Efficiency Standards appears to be cost-effective. As demonstrated by the Case study Energy Reports and Life Cycle Cost Analyses, each of the four study models could be modified to achieve the targeted 15% minimum margin of compliance over their respective baselines using sets of conventional Energy Conserving Measures and each of the four

cases demonstrate payback of the initial incremental costs associated with those measures.

However, each building's overall design, occupancy type and specific design choices may allow for a large range of incremental first cost and payback. All permit applicants should carefully analyze building energy performance to reduce incremental first cost and the payback for the required additional energy efficiency measures.

It is important to acknowledge that the possible range of measures is essentially infinite and, therefore, the relative initial costs and complexities associated with implementing various measures will vary considerably. In many instances, highly effective energy efficiency measures may carry little or no additional cost. For example, incorporation of passive design elements such as proper orientation of fenestration, overhangs and thermal mass can increase energy efficiency considerably for no increase in initial cost and reducing glazing area may actually reduce initial costs. Conversely, other options such as extensive photovoltaic systems may carry high initial costs. Initial costs may also be higher when efficiency measures are not considered and integrated into the design as a whole system.

BUILDING ENERGY ANALYSIS REPORT

PROJECT:

2-Unit Condo (0.1%) BASE CASE 2208 Manhattan Avenue/2207 Bayview Manhattan Beach, CA 90266

Project Designer:

Michael Lee Architects, Inc. 2200 Highland Avenue Manhattan Beach, CA 90266 (310) 545-5771

Report Prepared by:

Rick Newton NEWTON ENERGY 1401 19th Street Manhattan Beach, CA 90266 310 375-2699



Job Number:

8261R

Date:

10/13/2010

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2008 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

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HVAC System Heating and Cooling Loads Summary	13

EnergyPro 5.1 by EnergySoft Job Number: ID: 8261R User Number: 2100

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1	Central Furnace	е	80% AFUE	No	Cooling		13.0	SEER	Setback		New
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PERFORMANCE CERTIFICATE:	Residential	(Part 2 of 5)	CF-1R
Project Name 2-Unit Condo (0.1%) BASE CASE	Building Type ☐ Single Family ☐ Multi Family	☐ Addition Alone ☐ Existing+ Addition/Alteration	Date 10/13/2010
SPECIAL FEATURES INSPECTIO	N CHECKLIST		
The enforcement agency should pay special attention justification and documentation, and special verificatio determines the adequacy of the justification, and may the special justification and documentation submitted.	n to be used with the performan	ce approach. The enforcement ag	gency
The HVAC System Carrier Corp. 310JAV024045 does not inc	lude a cooling system, field verificati	ion is not necessary.	
HIGH MASS Design - Verify Thermal Mass: 630.0 ft² Covere	d Slab Floor, 3.500" thick at Baseme	ent	
HIGH MASS Design - Verify Thermal Mass: 465 sqft Concret	e, Heavyweight Exterior Mass, 8.00	0" thick at Basement	
The HVAC System Carrier Corp. 310JAV024045 does not inc	lude a cooling system, field verificati	ion is not necessary.	
HIGH MASS Design - Verify Thermal Mass: 65 sqft Concrete	, Heavyweight Exterior Mass, 8.000	" thick at Basement	
HIGH MASS Design - Verify Thermal Mass: 1,028.0 ft² Cover	red Slab Floor, 3.500" thick at Basen	ment	
HIGH MASS Design - Verify Thermal Mass: 575 sqft Concret	e, Heavyweight Exterior Mass, 8.00	0" thick at Basement	
HERS REQUIRED VERIFICATION Items in this section require field testing and/or verification of the section require field testing and/or verification.	erification by a certified HERS		eceive a
completed CF-4R form for each of the measures	listed below for final to be given	ven.	
EnergyPro 5.1 by EnergySoft	RunCode: 2010-10-11T14:08:44	ID: 8261R	Page 4 of 14

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Space Cooling	g	0.19	0.36	-0.18				
ans		3.23	3.35	-0.12				
Domestic Hot	Water	15.80	15.17	0.63				
Pumps		0.00	0.00	0.00				
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Floor		470	0.033								30 Ne		4.4.2-			_	oor Zone	
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Wall		320	0.074						34		90 Ne		4.3.1-			1st Flo	oor Zone	
Wall		249	0.074		-				_		00 Ne		4.3.1-				oor Zone	
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Wall		149	0.074		<u> </u>						90 Ne		4.3.1-			_	nent Zone	
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4	Window		24.0	0.330			NFRC		30 New							d Floor 2		
5	Window		20.0	0.330	NFRC		NFRC	16	60 New							d Floor 2		
6	Window		68.5	0.330			NFRC		30 New							d Floor Z		
7	Window		76.5	0.330			NFRC		0 New							d Floor Z		
8 9	Window Window		60.0 60.0	0.330 0.330			NFRC NFRC		50 New 50 New							d Floor 2 d Floor 2		
10	Window		53.8	0.330			NFRC	25								d Floor 2		
11	Window		20.0	0.330			NFRC	_	10 New							t Floor Z		
12	Window	,	70.0	0.330	NFRC	0.31	NFRC	34	10 New	′ .	leld-W	Ven W	ood W	indows L	ow-E 1s	t Floor Z	one	
13	Window		60.0	0.330			NFRC		60 New							t Floor Z		
14	Window		90.0	0.330			NFRC		60 New 60 New							t Floor Z		
15 16	Window Window		11.0 40.0	0.330 0.330			NFRC NFRC		50 New 50 New							t Floor Z t Floor Z		
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Roof		198	0.036					_		0	0 New		4.2.2-A16			or Zone	
<i>Nall</i> Door		244 21	0.074 0.500			-		-			90 New 90 New		4.3.1-A5 4.5.1-A4			or Zone or Zone	
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21	Windo		10.0		NFRC		NFRC		50 New				od Windows I				
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27	Windo	ow .	18.0	0.330	NFRC	0.31	NFRC	1	60 New	′ ,	Jeld-We	n Woo	od Windows I	Low-E 2	nd Floor Z	one	
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37 38	Window Window	44.0 36.0	0.330 0.330			NFRC NFRC		0 New 0 New					/indows I					
39	Window	174.0	0.330			NFRC		0 New					d Windows Low-E Basement Zone d Windows Low-E Basement Zone					
40	Window	10.0	0.330			NFRC		0 New					/indows l					
41	Window	44.0	0.330	NFRC	0.31	NFRC	25	0 New		Jeld	l-Wen V	Vood VI	/indows I	Low-E	Bas	ement 2	Zone	
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CERTIFICATE	E OF	E CC	ЭМР	LIAN	CE	: R	esic	den	tial				(P	art :	5 of :	5)	С	F-1R
Project Name			2405			Build	ing Ty			igle Fam						utian	Date	_
2-Unit Condo (0.19 BUILDING ZONE II				:					스 Mu	lti Famil	У	LI EXI	sting	- Aac	ition/A	Iteration	10/1	13/2010
BUILDING ZONE II	NEOR	WAI	ON			$\overline{}$				Floor A	rea	(ft ²)						
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Unit A System			nd Floor					900								8,910		
		First F						1,014	+							8,213	<u> </u>	
Unit B System		Basen	nent nd Floor					930 930								5,103 8,370		
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MANDATORY MEASURES SUMMARY: Residential

(Page 1 of 3)

MF-1R

Project Name

2-Unit Condo (0.1%) BASE CASE

10/13/2010

NOTE: Low-rise residential buildings subject to the Standards must comply with all applicable mandatory measures listed, regardless of the compliance approach used. More stringent energy measures listed on the Certificate of Compliance (CF-1R, CF-1R-ADD, or CF-1R-ALT Form) shall supersede the items marked with an asterisk (*) below. This Mandatory Measures Summary shall be incorporated into the permit documents, and the applicable features shall be considered by all parties as minimum component performance specifications whether they are shown elsewhere in the documents or in this summary. Submit all applicable sections of the MF-1R Form with plans.

Building Envelope Measures:

- §116(a)1: Doors and windows between conditioned and unconditioned spaces are manufactured to limit air leakage.
- §116(a)4: Fenestration products (except field-fabricated windows) have a label listing the certified U-Factor, certified Solar Heat Gain Coefficient (SHGC), and infiltration that meets the requirements of §10-111(a).
- §117: Exterior doors and windows are weather-stripped; all joints and penetrations are caulked and sealed.
- §118(a): Insulation specified or installed meets Standards for Insulating Material. Indicate type and include on CF-6R Form.
- §118(i): The thermal emittance and solar reflectance values of the cool roofing material meets the requirements of §118(i) when the installation of a Cool Roof is specified on the CF-1R Form.
- *§150(a): Minimum R-19 insulation in wood-frame ceiling or equivalent U-factor.
- §150(b): Loose fill insulation shall conform with manufacturer's installed design labeled R-Value.
- *§150(c): Minimum R-13 insulation in wood-frame wall or equivalent U-factor.
- *§150(d): Minimum R-13 insulation in raised wood-frame floor or equivalent U-factor.
- §150(f): Air retarding wrap is tested, labeled, and installed according to ASTM E1677-95(2000) when specified on the CF-1R Form.
- §150(g): Mandatory Vapor barrier installed in Climate Zones 14 or 16.
- §150(l): Water absorption rate for slab edge insulation material alone without facings is no greater than 0.3%; water vapor permeance rate is no greater than 2.0 perm/inch and shall be protected from physical damage and UV light deterioration.

Fireplaces, Decorative Gas Appliances and Gas Log Measures:

- §150(e)1A: Masonry or factory-built fireplaces have a closable metal or glass door covering the entire opening of the firebox.
- §150(e)1B: Masonry or factory-built fireplaces have a combustion outside air intake, which is at least six square inches in area and is equipped with a with a readily accessible, operable, and tight-fitting damper and or a combustion-air control device.
- §150(e)2: Continuous burning pilot lights and the use of indoor air for cooling a firebox jacket, when that indoor air is vented to the outside of the building, are prohibited.

Space Conditioning, Water Heating and Plumbing System Measures:

- §110-§113: HVAC equipment, water heaters, showerheads, faucets and all other regulated appliances are certified by the Energy Commission.
- §113(c)5: Water heating recirculation loops serving multiple dwelling units and High-Rise residential occupancies meet the air release valve, backflow prevention, pump isolation valve, and recirculation loop connection requirements of §113(c)5.
- §115: Continuously burning pilot lights are prohibited for natural gas: fan-type central furnaces, household cooking appliances (appliances with an electrical supply voltage connection with pilot lights that consume less than 150 Btu/hr are exempt), and pool and spa heaters.
- §150(h): Heating and/or cooling loads are calculated in accordance with ASHRAE, SMACNA or ACCA.
- §150(i): Heating systems are equipped with thermostats that meet the setback requirements of Section 112(c).
- §150(j)1A: Storage gas water heaters rated with an Energy Factor no greater than the federal minimal standard are externally wrapped with insulation having an installed thermal resistance of R-12 or greater.
- §150(j)1B: Unfired storage tanks, such as storage tanks or backup tanks for solar water-heating system, or other indirect hot water tanks have R-12 external insulation or R-16 internal insulation where the internal insulation R-value is indicated on the exterior of the tank.
- §150(j)2: First 5 feet of hot and cold water pipes closest to water heater tank, non-recirculating systems, and entire length of recirculating sections of hot water pipes are insulated per Standards Table 150-B.
- §150(j)2: Cooling system piping (suction, chilled water, or brine lines), and piping insulated between heating source and indirect hot water tank shall be insulated to Table 150-B and Equation 150-A.
- §150(j)2: Pipe insulation for steam hydronic heating systems or hot water systems >15 psi, meets the requirements of Standards Table 123-A.
- §150(j)3A: Insulation is protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind.
- §150(j)3A: Insulation for chilled water piping and refrigerant suction lines includes a vapor retardant or is enclosed entirely in conditioned space.
- §150(j)4: Solar water-heating systems and/or collectors are certified by the Solar Rating and Certification Corporation.

MANDATORY MEASURES SUMMARY: Residential	(Page 2 of 3)	MF-1R
Project Name		Date
2-Unit Condo (0.1%) BASE CASE		10/13/2010

§150(m)1: All air-distribution system ducts and plenums installed, are sealed and insulated to meet the requirements of CMC Sections 601, 602, 603, 604, 605 and Standard 6-5; supply-air and return-air ducts and plenums are insulated to a minimum installed level of R-4.2 or enclosed entirely in conditioned space. Openings shall be sealed with mastic, tape or other duct-closure system that meets the applicable requirements of UL 181, UL 181A, or UL 181B or aerosol sealant that meets the requirements of UL 723. If mastic or tape is used to seal openings greater than 1/4 inch, the combination of mastic and either mesh or tape shall be used

§150(m)1: Building cavities, support platforms for air handlers, and plenums defined or constructed with materials other than sealed sheet metal, duct board or flexible duct shall not be used for conveying conditioned air. Building cavities and support platforms may contain ducts. Ducts installed in cavities and support platforms shall not be compressed to cause reductions in the cross-sectional area of the ducts.

§150(m)2D: Joints and seams of duct systems and their components shall not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.

§150(m)7: Exhaust fan systems have back draft or automatic dampers.

§150(m)8: Gravity ventilating systems serving conditioned space have either automatic or readily accessible, manually operated dampers.

§150(m)9: Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material.

§150(m)10: Flexible ducts cannot have porous inner cores.

§150(o): All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2-2007 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. Window operation is not a permissible method of providing the Whole Building Ventilation required in Section 4 of that Standard.

Pool and Spa Heating Systems and Equipment Measures:

§114(a): Any pool or spa heating system shall be certified to have: a thermal efficiency that complies with the Appliance Efficiency Regulations; an on-off switch mounted outside of the heater; a permanent weatherproof plate or card with operating instructions; and shall not use electric resistance heating or a pilot light.

§114(b)1: Any pool or spa heating equipment shall be installed with at least 36" of pipe between filter and heater, or dedicated suction and return lines, or built-up connections for future solar heating.

§114(b)2: Outdoor pools or spas that have a heat pump or gas heater shall have a cover.

§114(b)3: Pools shall have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.

§150(p): Residential pool systems or equipment meet the pump sizing, flow rate, piping, filters, and valve requirements of §150(p).

Residential Lighting Measures:

§150(k)1: High efficacy luminaires or LED Light Engine with Integral Heat Sink has an efficacy that is no lower than the efficacies contained in Table 150-C and is not a low efficacy luminaire as specified by §150(k)2.

§150(k)3: The wattage of permanently installed luminaires shall be determined as specified by §130(d).

§150(k)4: Ballasts for fluorescent lamps rated 13 Watts or greater shall be electronic and shall have an output frequency no less than 20 kHz.

§150(k)5: Permanently installed night lights and night lights integral to a permanently installed luminaire or exhaust fan shall contain only high efficacy lamps meeting the minimum efficacies contained in Table 150-C and shall not contain a line-voltage socket or line-voltage lamp holder; OR shall be rated to consume no more than five watts of power as determined by §130(d), and shall not contain a medium screw-base socket.

§150(k)6: Lighting integral to exhaust fans, in rooms other than kitchens, shall meet the applicable requirements of §150(k).

§150(k)7: All switching devices and controls shall meet the requirements of §150(k)7.

§150(k)8: A minimum of 50 percent of the total rated wattage of permanently installed lighting in kitchens shall be high efficacy. EXCEPTION: Up to 50 watts for dwelling units less than or equal to 2,500 ft₂ or 100 watts for dwelling units larger than 2,500 ft₂ may be exempt from the 50% high efficacy requirement when: all low efficacy luminaires in the kitchen are controlled by a manual on occupant sensor, dimmer, energy management system (EMCS), or a multi-scene programmable control system; and all permanently installed luminaries in garages, laundry rooms, closets greater than 70 square feet, and utility rooms are high efficacy and controlled by a manual-on occupant sensor.

§150(k)9: Permanently installed lighting that is internal to cabinets shall use no more than 20 watts of power per linear foot of illuminated cabinet.

MANDATORY MEASURES SUMMARY: Residential	(Page 3 of 3)	MF-1R
Project Name		Date
2-Unit Condo (0.1%) BASE CASE		10/13/2010

§150(k)10: Permanently installed luminaires in bathrooms, attached and detached garages, laundry rooms, closets and utility rooms shall be high efficacy.

EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by a manual-on occupant sensor certified to comply with the applicable requirements of §119.

EXCEPTION 2: Permanently installed low efficacy luminaires in closets less than 70 square feet are not required to be controlled by a manual-on occupancy sensor.

§150(k)11: Permanently installed luminaires located in rooms or areas other than in kitchens, bathrooms, garages, laundry rooms, closets, and utility rooms shall be high efficacy luminaires. EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided they are controlled by either a dimmer switch that complies with the applicable requirements of §119, or by a manual-on occupant sensor that complies with the applicable requirements of §119. EXCEPTION 2: Lighting in detached storage building less than 1000 square feet located on a residential site is not required to comply with §150(k)11.

§150(k)12: Luminaires recessed into insulated ceilings shall be listed for zero clearance insulation contact (IC) by Underwriters Laboratories or other nationally recognized testing/rating laboratory; and have a label that certifies the luminaire is airtight with air leakage less then 2.0 CFM at 75 Pascals when tested in accordance with ASTM E283; and be sealed with a gasket or caulk between the luminaire housing and ceiling.

§150(k)13: Luminaires providing outdoor lighting, including lighting for private patios in low-rise residential buildings with four or more dwelling units, entrances, balconies, and porches, which are permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy. EXCEPTION 1: Permanently installed outdoor low efficacy luminaires shall be allowed provided that they are controlled by a manual on/off switch, a motion sensor not having an override or bypass switch that disables the motion sensor, and one of the following controls: a photocontrol not having an override or bypass switch that disables the photocontrol; OR an astronomical time clock not having an override or bypass switch that disables the astronomical time clock; OR an energy management control system (EMCS) not having an override or bypass switch that allows the luminaire to be always on EXCEPTION 2: Outdoor luminaires used to comply with Exception1 to §150(k)13 may be controlled by a temporary override switch which bypasses the motion sensing function provided that the motion sensor is automatically reactivated within six hours. EXCEPTION 3: Permanently installed luminaires in or around swimming pool, water features, or other location subject to Article 680 of the California Electric Code need not be high efficacy luminaires.

§150(k)14: Internally illuminated address signs shall comply with Section 148; OR not contain a screw-base socket, and consume no more than five watts of power as determined according to §130(d).

§150(k)15: Lighting for parking lots and carports with a total of for 8 or more vehicles per site shall comply with the applicable requirements in Sections 130, 132, 134, and 147. Lighting for parking garages for 8 or more vehicles shall comply with the applicable requirements of Sections 130, 131, 134, and 146.

§150(k)16: Permanently installed lighting in the enclosed, non-dwelling spaces of low-rise residential buildings with four or more dwelling units shall be high efficacy luminaires. EXCEPTION: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by an occupant sensor(s) certified to comply with the applicable requirements of §119.

System Name	E CASE						13/2010
Init A System							Area 2,544
ENGINEERING CHECKS		SYSTEM LOAD					2,344
	1	STSTEWILOAD	0011	COOLING D	FAL	0011 11	TO DEAK
lumber of Systems leating System	'		CFM	COOLING P Sensible	Latent	CFM	TG. PEAK Sensible
Output per System	35,000	Total Room Loads	1,985		3,320	690	25,527
Total Output (Btuh)	35,000	Return Vented Lighting	1,000	0	0,020		20,021
Output (Btuh/sqft)	13.8	Return Air Ducts		2,107			1,24
Cooling System	10.0	Return Fan		0			1,24
Output per System	0	Ventilation	0	0	0	0	
Total Output (Btuh)	0	Supply Fan		0	<u> </u>		
Total Output (Tons)	0.0	Supply Air Ducts		2,107			1,24
Total Output (Tons) Total Output (Btuh/sqft)	0.0	Supply All Ducts		2,107			1,27
Total Output (sqft/Ton)	0.0	TOTAL SYSTEM LOAD		51,207	3,320		28,009
Air System	0.0	TOTAL STSTEM LOAD		31,207	5,520		20,000
CFM per System	1,995	HVAC EQUIPMENT SELECTION					
•	1,995			0	0		35,000
Airflow (cfm)	0.78	Carrier Corp. 3100AV024043		O O	0		33,000
Airflow (cfm/sqft)	0.78						
Airflow (cfm/Ton)	0.0 %	Total Adiusted System Output		0	0		35,000
Outside Air (%)	0.00	Total Adjusted System Output (Adjusted for Peak Design conditions)		U	0		33,000
Outside Air (cfm/sqft)					Aug 2 DM		Jan 1 AN
lote: values above given at ARI		TIME OF SYSTEM PEAK (Airstream Temperatures at Time)	of Heating	Peak)	Aug 3 PM		Jan I An
Outside Air 0 cfm	69 °F Heating 0	Coil Supply Fan 1,995 cfm	105 °F →		RC	ОМ	04 °F
OOLING SYSTEM PSYCHR 4 / 69 °F Outside Air 0 cfm		Airstream Temperatures at Time of 1/63 °F 55 / 54 °F 55 °F 55 / 54 °F 55 °F 55 / 54 °F 55		Peak)	6 RC	ОМ	/ 54 °F / 63 °F

Project Name 2-Unit Condo (0.1%) BAS	E CASE						13/2010
System Name							Area
Jnit B System		CVCTEMICAD					2,658
ENGINEERING CHECKS		SYSTEM LOAD					
Number of Systems	1			COOLING P			TG. PEAK
Heating System	05.000		CFM	Sensible	Latent	CFM	Sensible
Output per System	35,000	Total Room Loads	2,007	47,481	3,361	729	26,953
Total Output (Btuh)	35,000	Return Vented Lighting		0			4.046
Output (Btuh/sqft)	13.2	Return Air Ducts		2,129			1,310
Cooling System		Return Fan		0			(
Output per System	0	Ventilation	0	0	0	0	(
Total Output (Btuh)	0	Supply Fan		0			(
Total Output (Tons)	0.0	Supply Air Ducts		2,129			1,310
Total Output (Btuh/sqft)	0.0			Γ			_
Total Output (sqft/Ton)	0.0	TOTAL SYSTEM LOAD		51,740	3,361		29,573
Air System							
CFM per System	1,995	HVAC EQUIPMENT SELECTION					
Airflow (cfm)	1,995	Carrier Corp. 310JAV024045		0	0	_	35,000
Airflow (cfm/sqft)	0.75						
Airflow (cfm/Ton)	0.0						
Outside Air (%)	0.0 %	Total Adjusted System Output		0	0		35,000
Outside Air (cfm/sqft)	0.00	(Adjusted for Peak Design conditions)					
Note: values above given at ARI		TIME OF SYSTEM PEAK			Aug 3 PM		Jan 1 AN
HEATING SYSTEM PSYCHRO	OMETRICS (Airstream Temperatures at Time of	of Heating	Peak)			
Outside Air	69 °F Heating (105 °F Coil Supply Fan 1,995 cfm	105 °F →		RC) OOM	04 °F
69 °F COOLING SYSTEM PSYCHR	OMETICS (A	Airstream Temperatures at Time of	f Cooling F	Peak)			70 °F
				· · · · · · · · · · · · · · · · · · ·			
84 / 69 °F	79	/63 °F 55 / 54 °F 55 / 5	o4 °F 		_		
Outside Air 0 cfm		Cooling Coil Supply Fan 1,995 cfm	→	42.3 %	RC	56 OOM	/ 54 °F
79 / 63 °F	-	_				78	/ 63 °F

BUILDING ENERGY ANALYSIS REPORT

PROJECT:

2-Unit Condo (15%) All ECM's 2208 Manhattan Avenue/2207 Bayview Manhattan Beach, CA 90266

Project Designer:

Michael Lee Architects, Inc. 2200 Highland Avenue Manhattan Beach, CA 90266 (310) 545-5771

Report Prepared by:

Rick Newton NEWTON ENERGY 1401 19th Street Manhattan Beach, CA 90266 310 375-2699



Job Number:

8261R

Date:

10/16/2010

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2008 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

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HVAC System Heating and Cooling Loads Summary	13
Form ECON-1 Energy Use and Cost Summary	15

EnergyPro 5.1 by EnergySoft Job Number: ID: 8261R User Number: 2100

	ORMANC	E CEF	RTIFICAT	ΓE: F	Reside	ential			(Part 1	l of 5)	CF-1R
Project Na				Build	ding Type	•	•	y 🗆 Additi		/ A I	Date
Project Add	ondo (15%)	All ECM	S	Cali	farnia Ena	ergy Clima	ti Family	Total Cond.	-	n/Alteration Addition	# of Stories
-	anhattan Ave	nue/220	7 Bayview			ate Zon		5,2		n/a	3
FIELD	INSPEC [®]	TION E	NERGY	CHE	CKLI	ST					
1 Yes	□ No HE	RS Mea	asures I	f Yes,	A CF-4	4R mus	t be p	rovided p	oer Part	2 of 5 of th	nis form.
1 Yes	□ No Sp						-	•			
	ATION					Area		ecial			
	uction Ty	pe		Cav	ity	(ft^2)	•	tures (s	ee Part	2 of 5)	Status
oof	Wood Framed F	•		R-30		2,195		`		,	New
'all	Wood Framed			R-19		3,852					New
oor	Wood Framed v	v/o Crawl S _l	pace	R-30		470					New
ab	Unheated Slab-	on-Grade		None		1,658	Perim =	: 88'			New
'allBG	Hollow Unit Mas	sonry		None		1,105	Int=R-1	3.0 Depth =	109.000"		New
oor	Opaque Door			None		40					New
oof	Span Deck or C	oncrete		None		161	Int=R-3	0.0			New
_	TRATION	- 102	U-		^	L	0:4-6	_	erior		01-1
Orienta				HGC	Overl	nang	Sidefi		ides		Status
ear (N)	-	657.0	0.330	0.31	none		none		Screen		New
ont (S)		54.0	0.330	0.31	5.0		none		Screen		New
ont (S)		451.0	0.330	0.31	none		none		Screen		New
ont (S)		68.5	0.330	0.31	10.0		none		Screen		New
eft (W)		257.5	0.330	0.31	none		none		Screen		New
eft (W)		60.0	0.330	0.31	14.0		none		Screen		New
eft (W)		209.8	0.330	0.31	5.0		none	-	Screen		New
eft (W)		112.0	0.330	0.31	10.0		none		Screen		New
ight (E)		43.0	0.330	0.31	none		none		Screen		New
ront (S)		54.0	0.330	0.31	7.0		none	Bug	Screen		New
IVAC	SYSTEMS										
રેty. I	Heating		Min. Eff	Co	oling		Min	. Eff	The	rmostat	Status
1 (Central Furnace		95% AFUE	No	Cooling		13.0	SEER	Setback	(New
1 (Central Furnace		95% AFUE	No	Cooling		13.0	SEER	Setback	(New
IVAC	DISTRIBUT	ΓΙΟΝ							[Duct	
ocatio	on	Hea	ting	Co	oling	Duc	t Loca	tion	F	R-Value	Status
nit A Syst	em (80% to 95%	Ducted		Duc	ted	Attic, C	eiling Ins	, vented		4.2	New
nit B Syst	em (80% to 95%	Ducted		Duc	ted	Attic, C	eiling Ins	, vented	4	4.2	New
VATE	R HEATING	<u> </u>									
	Гуре		Gall	lons	Min.	Eff	Distril	oution			Status
	Instant Gas		0		0.84		Kitchen I	Pipe Ins			New
			-		-			•			

PERFORMANCE CERTI	FICATE: Reside	ential	(Part 2 of 5)	CF-1R
Project Name 2-Unit Condo (15%) All ECM's	Building Type	□ Single Family ☑ Multi Family	☐ Addition Alone ☐ Existing+ Addition/Alteration	Date 10/16/2010
SPECIAL FEATURES IN The enforcement agency should pay sp justification and documentation, and spe determines the adequacy of the justifica- the special justification and documentat	ecial attention to the items ecial verification to be used ation, and may reject a build	specified in this che with the performan	ce approach. The enforcement ag	gency
The HVAC System Carrier Corp. 58MXB040-		g system, field verificat	tion is not necessary.	
HIGH MASS Design - Verify Thermal Mass:				
HIGH MASS Design - Verify Thermal Mass:	465 sqft Concrete, Heavyweig	tht Exterior Mass, 8.00	0" thick at Basement	
The HVAC System Carrier Corp. 58MXB040-	12x does not include a cooling	g system, field verificat	tion is not necessary.	
HIGH MASS Design - Verify Thermal Mass:				
HIGH MASS Design - Verify Thermal Mass:	1,028.0 ft ² Covered Slab Floor	r, 3.500" thick at Baser	ment	
HIGH MASS Design - Verify Thermal Mass:	575 sqft Concrete, Heavyweig	ht Exterior Mass, 8.00	0" thick at Basement	
HERS REQUIRED VERIF	FICATION			
Items in this section require field test completed CF-4R form for each of t				eceive a
Compliance credit for quality installation of in-				
Compliance credit for quality installation of in-	sulation has been used. HER	S field verification is re	quired.	
EnergyPro 5.1 by EnergySoft User Numb	per: 2100 RunCode: 20	10-10-16T18:46:21	ID: 8261R	Page 4 of 15

PERFORM	MANCE (JEKII	FICATE:	Residen			rt 3 of 5)	CF-1R
Project Name 2-Unit Condo	o (15%) All E	ECM's		Building Type	☐ Single Family ☐ Multi Family		lone Addition/Alteration	Date 10/16/2010
ANNUAL ENE			Υ		•			1.07.107.20.10
TD\/	Sta		Proposed	Margin				
	ı/ft ² -yr)							
Space Heating	g	20.00	16.45	3.55				
Space Cooling	9	0.23	0.35	-0.12				
Fans		3.19	3.22	-0.03				
Domestic Hot	Water	15.80	11.90	3.91				
Pumps		0.00	0.00	0.00				
	Totals	39.22	31.90	7.31				
Percent Bette				18.6 %				
В	UILDIN	G CO	MPLIES	S - HERS	S VERIFIC	ATION I	REQUIRED	
D E .	.		(0)	460 des	E . W. II (D			enestration
Building Front				160 deg	Ext. Walls/R	oot Wa	II Area	Area
Number of Dw	_			2.00	(S)		1,778	628
Fuel Available				ıral Gas	(W)		989	639
Raised Floor				470	(N)		2,582	657
Slab on Grade				,658	(E)		510	43
Average Ceilir		. –		8.9	Roof		2,356	1.007
Fenestration	Average U			0.33	_		TOTAL:	1,967
REMARKS	Average S	HGC:	(0.31	F(enestration/C	rA Katio:	37.8 %
Batts. 15% CASE: ECM-8 Furnace u ECM-6 - Quality In		E 80% to 95	%: 8.0%;	nt Retaining Walls				
15% CASE: ECM-8 Furnace u ECM-6 - Quality In STATEMEN This certificate to comply with	NT OF COI e of complian	E 80% to 95 ation (Needs WPLIAN ace lists the	%: 8.0%; s HERS): 2.3% ICE ne building f	eatures and specifications	pecifications nee s and Part 6 the	ded		
15% CASE: ECM-8 Furnace u ECM-6 - Quality In STATEMEN This certificate to comply with Efficiency Star	NT OF COI e of complian Title 24, Pai ndards of the	MPLIAN ace lists the percentage of the percentag	%: 8.0%; s HERS): 2.3% ICE ne building f Administration of F	eatures and specifications.	s and Part 6 the			
15% CASE: ECM-8 Furnace u ECM-6 - Quality In STATEMEN This certificate to comply with Efficiency Star	NT OF COI e of complian n Title 24, Pai ndards of the tation author	WPLIAN uce lists the control of the	%: 8.0%; s HERS): 2.3% ICE ne building f Administration of F	eatures and specifications.				
15% CASE: ECM-8 Furnace u ECM-6 - Quality In STATEMEN This certificate to comply with Efficiency Star The documenta	NT OF COI e of complian n Title 24, Pan ndards of the tation author	MPLIAN ace lists the Californi hereby cor	%: 8.0%; s HERS): 2.3% ICE ne building f Administration of F	eatures and specifications.	s and Part 6 the			
15% CASE: ECM-8 Furnace u ECM-6 - Quality In STATEMEN This certificate to comply with Efficiency Star The document Documenta Company NE	NT OF COI e of complian n Title 24, Pai ndards of the tation author ation Auth	MPLIAN ace lists the Californi hereby cor	%: 8.0%; s HERS): 2.3% ICE ne building f Administration of F	eatures and spoke Regulations.	s and Part 6 the ation is accurate		е.	0/16/2010
15% CASE: ECM-8 Furnace u ECM-6 - Quality In STATEMEN This certificate to comply with Efficiency Star The document Documenta Company NE	NT OF COI e of complian n Title 24, Pan ndards of the tation author	MPLIAN ace lists the Californi hereby cor	%: 8.0%; s HERS): 2.3% ICE ne building f Administration of F	eatures and specifications.	s and Part 6 the ation is accurate		е.	0/16/2010
STATEMEN This certificate to comply with Efficiency Star Documenta Company Address NERCHARAGE NERCHA	NT OF COI e of complian n Title 24, Pan ndards of the tation author ation Auth EWTON ENERG	MPLIAN ace lists the californic hereby cores	%: 8.0%; s HERS): 2.3% ICE ne building f Administration of F	eatures and spoke Regulations.	ation is accurate		е.	<i>0/16/2010</i> Date
STATEMEN This certificate to comply with Efficiency Star The documenta Company NE City/State/Zip Ma The individual of construction with any other duct sealing, v	NT OF COI e of complian n Title 24, Pa ndards of the tation author ation Auth EWTON ENERGE anhattan Beach, with overall n documents calculations verification of	MPLIAN ACE lists the Californic CA 90266 design reis consis submitted refrigera	%: 8.0%; s HERS): 2.3% ICE ne building f Administration a Code of F ertifies that sponsibility tent with the d with this p nt charge, in	eatures and specific permit applications applications.	ation is accurate	Signed sed building overksheets, ves that completed building end building end	e. design represent vith the specificat oliance using duc	Date ed in this set tions, and ct design,
STATEMEN This certificate to comply with Efficiency Star The documenta Company Address City/State/Zip Ma The individual of construction with any other duct sealing, vinstaller testing Designer o	NT OF COI e of complian n Title 24, Pa ndards of the tation author ation Auth EWTON ENERGE anhattan Beach, with overall n documents r calculations verification of g and certific	MPLIAN to elists the state Californi hereby cores CA 90266 design resis consis submitted refrigera ation and over Business	%: 8.0%; s HERS): 2.3% ICE ne building f Administration a Code of F ertifies that sponsibility tent with the d with this p nt charge, in I field verifice	eatures and speed to the documents of th	ation is accurate wton 6-2699 es that the propose ance forms and vectors are proved HERS random vectors.	Signed sed building overksheets, ves that completed building end building end	e. design represent vith the specificat oliance using duc	Date ed in this set tions, and tt design,
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•	t Name	do (15%) A	All ECI	M's		В	uilding T		1 Single 1 Multi						/Alteration	Dat	e 16/2010
			ACE D														107	10,2010
Surfa			U-			Insulatio	n						Jo	int App	endix			
Тур	e A	rea	Factor	,	Exterio	r Frame	Interio	or Fram	ie Azr	n Tilt		itus		4			ation/Co	mments
Roof		900	0.036							0	0 New		4.2.2-			_	loor Zone	
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Wall		111	0.074						_		0 Леи		4.3.1-			_	oor Zone	
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ovaii Door		149	0.500								0 Neu		4.5.1-			_	nent Zone	
	ESTR/				DETAIL	S	-									1 - 3 - 3 - 3		
ID	Туре		Area	U-Fa			GC^2	Azm	n Sta	atus		Glaz	zing T	уре		Locati	on/Comr	nents
1	Window		51.0	0.330			NFRC	_	10 New		leld-We				ow-E 2n	d Floor Z		
2	Window	,	30.0	0.330			NFRC	_	10 New							d Floor 2		
3	Window		30.0	0.330			NFRC		0 New							d Floor Z		
<u>4</u> 5	Window Window		24.0	0.330 0.330			NFRC NFRC		60 New 60 New							d Floor 2		
6	Window		68.5	0.330			NFRC		30 New		Jeld-Wen Wood Windows Low-E 2nd Floor Zone Jeld-Wen Wood Windows Low-E 2nd Floor Zone							
7	Window		76.5	0.330			NFRC		30 New		Jeld-Wen Wood Windows Low-E 2nd Floor Zone							
8	Window	′	60.0	0.330			NFRC		0 New							d Floor Z		
9	Window		60.0	0.330			NFRC		0 New							d Floor Z		
10 11	Window Window		53.8 20.0	0.330 0.330			NFRC NFRC	25	_							d Floor Z t Floor Z		
12	Window		70.0	0.330			NFRC	_	10 New							t Floor Z		
13	Window		60.0	0.330			NFRC		60 New		leld-We	n Wo	ood Wi	ndows L	ow-E 1s	t Floor Z	one	
14	Window		90.0	0.330			NFRC		60 New							t Floor Z		
15	Window		11.0	0.330			NFRC		0 New							t Floor Z		
16	Window 1) U-F		40.0	0.330	= Default		NFRC m Stanc		New			en vvc	ooa vvi	naows L	_OW-E 1S	t Floor Z	one	
	2) SHC				= Default													
EXT	ERIOR	SHA	ADING	DETA	ILS													
						Wind				hang	1			Left Fir			Right F	
ID			hade Ty	pe S	SHGC	Hgt	Wd	Len	Hgt	LExt	RE	t I	Dist	Len	Hgt	Dist	Len	Hgt
	Bug Sci Bug Sci				0.76 0.76							_						
	Bug Sci				0.76	8.0	3.8	5.0	0.1	4.0	4	.0						
	Bug Sci				0.76	8.0	3.0	5.0	0.1	4.0		.0						
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	Bug Sci				0.76								-					
	Bug Sci Bug Sci				0.76 0.76	9.9	7.4	14.0	0.1	6.0	-	.0						
	Bug Sci				0.76	6.0	9.0	5.0	0.1	4.0		.0						
11	Bug Sci	reen			0.76													
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	Bug Sci Bug Sci			-	0.76 0.76							+				1		
	Bug Sci				0.76													
Enero	WPro 5 1	hy E	neraySof	1 119	er Numbe	~ 2100	Ru	nCode:	2010-1	0_16T18	·46·21		ID: 3	8261R			Par	ne 6 of 15

CE	RTIFIC	ATE (OF C	OMP	LIAN	CE:	Res	iden	tial			(Par	t 4 of	5)	(CF-1R
Projec	t Name					ı	Building 7			Family						ate
2-Un	it Condo	(15%)	All EC	M's				6	3 Multi F	amily	□ Exi	sting+ A	ddition/	Alteratio	on 10	/16/2010
OPA	QUE SU	RFACE [DETAIL	-S												
Surfa	ace	U-			Insulatio	n					J	oint App	endix			
Тур		a Factor	Cavity	Exterio			ior Fran	ne Az	m Tilt	Statu		4		Loca	ation/C	omments
Wall		9 0.074	R-19					2	50 9	0 New	4.3.1	'-A5		Basem	nent Zor	пе
Roof	93									0 New	_	?-A16			oor Zon	
Wall	32					-				0 New	4.3.1-A5 2nd Floor Zone 4.3.1-A5 2nd Floor Zone					
Wall Wall	29								60 9 70 9		4.3.1-A5 2nd Floor Zone 4.3.1-A5 2nd Floor Zone					
Wall	-	26 0.074							70 9 50 9	_	4.3.1				oor Zon	
Roof	19					+			_	0 New	_	?-A16			or Zone	
Wall	24	_							0 9		4.3.1				or Zone	
Door	2	21 0.500	None						0 9	0 New	4.5.1			1st Flo	or Zone)
Wall	20									0 New	4.3.1				or Zone	
Wall	31					-			60 9		4.3.1				or Zone	
Wall	-	16 0.074							70 9	_	4.3.1 4.3.1				or Zone	
Wall Roof	16	0.074	None			30.0	Woo		50 9 0	0 New 0 New	4.3.1				or Zone nent Zor	
Roof	10	6 0.036				30.0	7700	u		0 New		?-A16			nent Zor	
Wall		32 0.074						1		0 New	4.3.1				nent Zor	
FEN	ESTRAT			DETAIL	LS						·					
ID	Туре	Area		actor ¹		GC^2	Azr	n St	atus	G	lazing ⁻	Гуре		Location	on/Con	nments
	Window	18.0		NFRC	-	NFRC		250 Nev				- · · · · · · · · · · · · · · · · · · ·	Low-E 1st			
	Window	55.5	0.330			NFRC		250 Nev					Low-E 1st			
19	Window	28.0	0.330	NFRC	0.31	NFRC	3	340 Nev	/ J	eld-Wen	Wood N	/indows l	Low-E Bas	sement 2	Zone	
	Window	54.0		NFRC		NFRC		340 Nev			n Wood Windows Low-E Basement Zone					
	Window	10.0	0.330			NFRC		250 Nev			n Wood Windows Low-E Basement Zone					
	Window	24.0	0.330			NFRC		250 Nev			n Wood Windows Low-F Basement Zone					
	Window Window	24.0 25.0	0.330	NFRC		NFRC NFRC		250 Nev 340 Nev			en Wood Windows Low-E Basement Zone en Wood Windows Low-E 2nd Floor Zone					
25	Window	70.0		NFRC		NFRC		340 Nev					Low-E 2nd			
	Window	44.0		NFRC	l l	NFRC		60 Nev					Low-E 2nd			
27	Window	18.0		NFRC		NFRC		60 Nev	/ J	eld-Wen	Wood N	/indows l	Low-E 2nd	l Floor Z	one	
28	Window	60.0		NFRC		NFRC		60 Nev					Low-E 2nd			
	Window	28.0		NFRC		NFRC		70 Nev					Low-E 2nd			
	Window	156.0	0.330			NFRC		250 Nev					Low-E 2nd			
	Window Window	50.0 125.0	0.330			NFRC NFRC		250 Nev 340 Nev					Low-E 2nd Low-E 1st			
	1) U-Facto	or Type:	116-A	= Default	Table fro	m Star	ndards N	IFRC = I	abeled \	/alue	vvood vi	ririuows i	_OW-L 131	1 1001 20	JI IC	
	2) SHGC	Туре:	116-B	= Default	Table fro	m Star	ndards, N	IFRC = I	abeled \	/alue						
EXTI	ERIOR S	HADING	DETA	ILS												
					Wind	OW		Ove	rhang			Left Fi	า		Right	Fin
ID	Exterior	Shade Ty	/pe	SHGC	Hgt	Wd	Len	Hgt	LExt	RExt	Dist	Len	Hgt	Dist	Len	Hgt
	Bug Screei			0.76												
	Bug Screet			0.76												
	Bug Screer			0.76												
	Bug Screer Bug Screer			0.76 0.76												
	Bug Screer			0.76												
	Bug Screer			0.76	6.7	12.0	10.0	0.1	6.0	6.0						
	Bug Screei			0.76	-											
25	Bug Scree	1		0.76												
	Bug Screer			0.76												
	Bug Screer			0.76					ļ							
	Bug Screet			0.76 0.76					 							
	Bug Screer Bug Screer			0.76	9.0	17.4	5.0	0.1	4.0	4.0						
	Bug Screer			0.76	9.0	11.4	5.0	0.1	7.0	7.0						
	Bug Screer			0.76												
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Enero	vPro 5.1 by	EnergySo	ft IIs	er Numbe	r: 2100	R	unCode	2010-1	0-16T18	46:21	ID:	8261R			P	age 7 of 15

CE	RTIFIC	ATE (OF C	OMP	LIAN	CE:	Resid	lent	ial			(Pai	t 4	of 5))	C	F-1R	
	ct Name					Ві	uilding Typ	ре 🗆	Single	Family	□ Ad					Date		
	nit Condo	, ,						V	Multi I	amily	□Ex	isting+ A	Additio	n/Alte	ration	10/1	16/2010	
	QUE SUF		DETAIL					1										
Surfa		U- Footor	Covity		Insulation		or Frame	Azm	Tilt	Statu		Joint App	endix		oooti	ion/Cor	nments	
Typ WallB		_	None	Exterio	Fraiii	13.0	Wood			0 New		<u>4</u> 5-A10/4.3	13-,19			nt Zone		
Slab	1,02		None			70.0	77000			0 New	4.4.		. 70 00			nt Zone		
WallB			None			13.0	Wood	_	_	0 New		5-A10/4.3	1.13-J9			nent Zone		
Wall	16		R-19					340		0 New		1-A5	Basement Basement					
Wall	3	4 0.074	R-19					250	9	0 New	4.3.	1-A5		Bá	iseme	nt Zone		
																	-	
FEN	ESTRATI	ON SUR	FACE	DETAIL	-S	<u> </u>			<u> </u>	I								
ID	Type	Area	U-Fa			IGC ²	Azm	Sta	tus	G	lazing	Туре		Lo	catior	n/Comn	nents	
33	Window	11.5	0.330			NFRC	160	New	J	eld-Wen	Wood V	Vindows I	Low-E	1st Floo	or Zon	е		
34	Window	24.0	0.330			NFRC		New				Vindows I						
35 36	Window Window	54.0 15.0	0.330 0.330			NFRC NFRC		New New				Vindows I						
37	Window	44.0	0.330			NFRC		New			Wood Windows Low-E 1st Floor Zone Wood Windows Low-E 1st Floor Zone							
38	Window	36.0	0.330		0.31	NFRC		New	J	eld-Wen	Wood Windows Low-E Basement Zone							
39	Window	174.0	0.330			NFRC		New			Wood Windows Low-E Basement Zone							
40 41	Window Window	10.0 44.0	0.330 0.330			NFRC NFRC		New New			Wood Windows Low-E Basement Zone Wood Windows Low-E Basement Zone							
71	VVIIIGOW	44.0	0.330	NI KC	0.51	NIKC	230	1464		eiu-vveii	vvood v	VIIIUOWS I	_OW-L I	Daseiii	en 20	ii i C		
	(1) U-Facto (2) SHGC						lards, NFF lards, NFF											
	ERIOR SI	71			Table III	om otane	iaido, ivi i	10 - L	ibcica	value								
		., ., ., ., .,			Winc	low		Overh	ana			Left Fi	<u> </u>		F	Right Fi	in	
ID	Exterior	Shade Ty	/pe S	SHGC	Hgt	Wd	Len		LExt	RExt	Dist	Len	Hg	t D	ist	Len	Hgt	
	Bug Screen			0.76														
	Bug Screen Bug Screen			0.76 0.76	7.7	7.0	7.0	0.1	8.0	8.0							1	
	Bug Screen			0.76	1.1	7.0	7.0	J. I	0.0	6.0								
	Bug Screen			0.76	8.0	5.5	10.0	0.1	6.0	6.0								
	Bug Screen			0.76														
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	Bug Screen Bug Screen			0.76 0.76	6.7	12.0	10.0	0.1	6.0	6.0								
				0.70	J.,	. 2.0	. 3.0	J. 1	J.U	0.0								
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Energ	gyPro 5.1 by	EnergySo	ft Use	er Numbe	r: 2100	Ru	nCode: 2	010-10	-16T18	:46:21	ID	: 8261R				Pag	ge 8 of 15	

CERTIFICATE	E OF	E CC)MP	LIAN	CE:	Re	esic	nek	tial				(P	art {	5 of \$	5)	C	F-1R
Project Name		-04				Buildi	ding Type ☐ Single Family ☐ Addition Alone ☐ Multi Family ☐ Existing+ Addition/Alteration								Date	_		
2-Unit Condo (15%									⊿ IVIU	Iti Famii	у	LI EXI	sting-	- Aaa	ition/Ai	Iteration	10/1	16/2010
BUILDING ZONE IN	IFUR	MAII	ON							Floor A	rea	/ft ² \					1	
System Name		I	Zor	ne Name)	Ţ	Ne	w		kisting		Itered	R	emov	ed'	Volume	Υe	ear Built
Unit A System (80% to 95	5%)		nd Floor	-		\Box		900	+							8,910		
		First F				\dashv		1,014	-				\perp		\perp	8,213		
Unit B System (80% to 95	=0/ ₄)	Basen	nent nd Floor					630 930	 				+		-	5,103 8,370		
Office System (00% to 50	170)	First F				+		646	+				+		_	6,848		
		Basen				\top		1,082	-				+			8,764		
						\perp			<u> </u>		<u> </u>		\perp					
						\dashv			┼		<u> </u>		+		-			
						+			+				+		_			
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					Tota	ala		5,202	,	0	 		0		0			
HVAC SYSTEMS					1016	115		0,202					U _I		<u> </u>			
System Name		Qty.	He	ating Typ	ое	Min. I	Eff.		Coolin	ng Type		Min.	Eff.	Т	hermo	stat Type	T	Status
Unit A System (80% to 95		1		al Furnace	9	95% AI		No Co	ooling		13.0 SEER			Setba	ck		1	Vew
Unit B System (80% to 95	(80% to 95%) 1 Central Furnace			9)5% AI	FUE	No Co	Cooling 13.0 SEEF					R Setback				Vew	
	\longrightarrow		-				-											
	\longrightarrow		 		_		\dashv				-						+	
	\rightarrow				-+		\dashv				\neg						+	
HVAC DISTRIBUTION	ON																	
			,			_								Duc		Ducts		
System Name Unit A System (80% to 95	E0/ \	Ducted	Hea	ıting		Cool	Cooling		Duct Loca Attic, Ceiling Ins, v				+	R-Va	lue 4.2	Tested?		Status Vew
Unit A System (80% to 95)	,	Ducted				ucted			Attic, Ceiling Ins, v Attic, Ceiling Ins, v				+	4.2				vew Vew
Om. 2 Oyanan (1111111	7.57							+	ic, ocining mis, v				+	7.2			\top	
								<u> </u>										
WATER HEATING	SYST	EMS										—				T		
									Ra	ated	Tai	nk E	nerg	, s	tandby	Ext. Tank		
									In	put	Ca	p. F	acto	r L	oss or	Insul. I	- -	
System Name TAKAGI T-K1	Qty 2		Typo ant Gas		Di Kitchen	istribu n <i>Pi</i> ne		-+		tuh) 165,000	(ga		or RE 0.84	\perp	Pilot	Value n/a		Status
TANAGI I-NI		IIISIC	ini Gas	' ————————————————————————————————————	Kittiren	1 Pipe	Ins	_		765,000	0	-	U.0 4	+	n/a	11/a	- 1	Vew
	+													\dashv			+	
MULTI-FAMILY WA	TER	HEA.	TING							HYDR	ON	IC HE	ATII	IG S	YSTE	M PIPIN	<u>a</u>	
				Hot W			Leng	jth										
-			<u> E</u> l	 	1)	ft)	T	+	⁄2" atior									
	ļ	i	Eff. Premium	1					Add ½" Insulation						Pipe	Pipe	ڊ	Insul.
Control	Qty.	HP		Plenum	ı Out	tside	Bui	ried	` _	S	yste	m Nar	ne		Length			Thick.
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EnergyPro 5.1 by Energy	/Soft	HISE	r Niimh	er: 2100	- 1	RunC	ode:	2010-1	10-167	T18:46:2	1	ID.	82611	₹			Pac	ge 9 of 15

MANDATORY MEASURES SUMMARY: Residential (Page 1 of 3) MF-1R

Project Name Date

2-Unit Condo (15%) All ECM's

10/16/2010

NOTE: Low-rise residential buildings subject to the Standards must comply with all applicable mandatory measures listed, regardless of the compliance approach used. More stringent energy measures listed on the Certificate of Compliance (CF-1R, CF-1R-ADD, or CF-1R-ALT Form) shall supersede the items marked with an asterisk (*) below. This Mandatory Measures Summary shall be incorporated into the permit documents, and the applicable features shall be considered by all parties as minimum component performance specifications whether they are shown elsewhere in the documents or in this summary. Submit all applicable sections of the MF-1R Form with plans.

Building Envelope Measures:

- §116(a)1: Doors and windows between conditioned and unconditioned spaces are manufactured to limit air leakage.
- §116(a)4: Fenestration products (except field-fabricated windows) have a label listing the certified U-Factor, certified Solar Heat Gain Coefficient (SHGC), and infiltration that meets the requirements of §10-111(a).
- §117: Exterior doors and windows are weather-stripped; all joints and penetrations are caulked and sealed.
- §118(a): Insulation specified or installed meets Standards for Insulating Material. Indicate type and include on CF-6R Form.
- §118(i): The thermal emittance and solar reflectance values of the cool roofing material meets the requirements of §118(i) when the installation of a Cool Roof is specified on the CF-1R Form.
- *§150(a): Minimum R-19 insulation in wood-frame ceiling or equivalent U-factor.
- §150(b): Loose fill insulation shall conform with manufacturer's installed design labeled R-Value.
- *§150(c): Minimum R-13 insulation in wood-frame wall or equivalent U-factor.
- *§150(d): Minimum R-13 insulation in raised wood-frame floor or equivalent U-factor.
- §150(f): Air retarding wrap is tested, labeled, and installed according to ASTM E1677-95(2000) when specified on the CF-1R Form.
- §150(g): Mandatory Vapor barrier installed in Climate Zones 14 or 16.
- §150(I): Water absorption rate for slab edge insulation material alone without facings is no greater than 0.3%; water vapor permeance rate is no greater than 2.0 perm/inch and shall be protected from physical damage and UV light deterioration.

Fireplaces, Decorative Gas Appliances and Gas Log Measures:

- §150(e)1A: Masonry or factory-built fireplaces have a closable metal or glass door covering the entire opening of the firebox.
- §150(e)1B: Masonry or factory-built fireplaces have a combustion outside air intake, which is at least six square inches in area and is equipped with a with a readily accessible, operable, and tight-fitting damper and or a combustion-air control device.
- §150(e)2: Continuous burning pilot lights and the use of indoor air for cooling a firebox jacket, when that indoor air is vented to the outside of the building, are prohibited.

Space Conditioning, Water Heating and Plumbing System Measures:

- §110-§113: HVAC equipment, water heaters, showerheads, faucets and all other regulated appliances are certified by the Energy Commission.
- §113(c)5: Water heating recirculation loops serving multiple dwelling units and High-Rise residential occupancies meet the air release valve, backflow prevention, pump isolation valve, and recirculation loop connection requirements of §113(c)5.
- §115: Continuously burning pilot lights are prohibited for natural gas: fan-type central furnaces, household cooking appliances (appliances with an electrical supply voltage connection with pilot lights that consume less than 150 Btu/hr are exempt), and pool and spa heaters.
- §150(h): Heating and/or cooling loads are calculated in accordance with ASHRAE, SMACNA or ACCA.
- §150(i): Heating systems are equipped with thermostats that meet the setback requirements of Section 112(c).
- §150(j)1A: Storage gas water heaters rated with an Energy Factor no greater than the federal minimal standard are externally wrapped with insulation having an installed thermal resistance of R-12 or greater.
- §150(j)1B: Unfired storage tanks, such as storage tanks or backup tanks for solar water-heating system, or other indirect hot water tanks have R-12 external insulation or R-16 internal insulation where the internal insulation R-value is indicated on the exterior of the tank.
- §150(j)2: First 5 feet of hot and cold water pipes closest to water heater tank, non-recirculating systems, and entire length of recirculating sections of hot water pipes are insulated per Standards Table 150-B.
- §150(j)2: Cooling system piping (suction, chilled water, or brine lines), and piping insulated between heating source and indirect hot water tank shall be insulated to Table 150-B and Equation 150-A.
- §150(j)2: Pipe insulation for steam hydronic heating systems or hot water systems >15 psi, meets the requirements of Standards Table 123-A.
- §150(j)3A: Insulation is protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind.
- §150(j)3A: Insulation for chilled water piping and refrigerant suction lines includes a vapor retardant or is enclosed entirely in conditioned space.
- §150(j)4: Solar water-heating systems and/or collectors are certified by the Solar Rating and Certification Corporation.

MANDATORY MEASURES SUMMARY: Residential	(Page 2 of 3)	MF-1R
Project Name		Date
2-Unit Condo (15%) All ECM's		10/16/2010

§150(m)1: All air-distribution system ducts and plenums installed, are sealed and insulated to meet the requirements of CMC Sections 601, 602, 603, 604, 605 and Standard 6-5; supply-air and return-air ducts and plenums are insulated to a minimum installed level of R-4.2 or enclosed entirely in conditioned space. Openings shall be sealed with mastic, tape or other duct-closure system that meets the applicable requirements of UL 181, UL 181A, or UL 181B or aerosol sealant that meets the requirements of UL 723. If mastic or tape is used to seal openings greater than 1/4 inch, the combination of mastic and either mesh or tape shall be used

§150(m)1: Building cavities, support platforms for air handlers, and plenums defined or constructed with materials other than sealed sheet metal, duct board or flexible duct shall not be used for conveying conditioned air. Building cavities and support platforms may contain ducts. Ducts installed in cavities and support platforms shall not be compressed to cause reductions in the cross-sectional area of the ducts.

§150(m)2D: Joints and seams of duct systems and their components shall not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.

§150(m)7: Exhaust fan systems have back draft or automatic dampers.

§150(m)8: Gravity ventilating systems serving conditioned space have either automatic or readily accessible, manually operated dampers.

§150(m)9: Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material.

§150(m)10: Flexible ducts cannot have porous inner cores.

§150(o): All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2-2007 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. Window operation is not a permissible method of providing the Whole Building Ventilation required in Section 4 of that Standard.

Pool and Spa Heating Systems and Equipment Measures:

§114(a): Any pool or spa heating system shall be certified to have: a thermal efficiency that complies with the Appliance Efficiency Regulations; an on-off switch mounted outside of the heater; a permanent weatherproof plate or card with operating instructions; and shall not use electric resistance heating or a pilot light.

§114(b)1: Any pool or spa heating equipment shall be installed with at least 36" of pipe between filter and heater, or dedicated suction and return lines, or built-up connections for future solar heating.

§114(b)2: Outdoor pools or spas that have a heat pump or gas heater shall have a cover.

§114(b)3: Pools shall have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.

§150(p): Residential pool systems or equipment meet the pump sizing, flow rate, piping, filters, and valve requirements of §150(p).

Residential Lighting Measures:

§150(k)1: High efficacy luminaires or LED Light Engine with Integral Heat Sink has an efficacy that is no lower than the efficacies contained in Table 150-C and is not a low efficacy luminaire as specified by §150(k)2.

§150(k)3: The wattage of permanently installed luminaires shall be determined as specified by §130(d).

§150(k)4: Ballasts for fluorescent lamps rated 13 Watts or greater shall be electronic and shall have an output frequency no less than 20 kHz.

§150(k)5: Permanently installed night lights and night lights integral to a permanently installed luminaire or exhaust fan shall contain only high efficacy lamps meeting the minimum efficacies contained in Table 150-C and shall not contain a line-voltage socket or line-voltage lamp holder; OR shall be rated to consume no more than five watts of power as determined by §130(d), and shall not contain a medium screw-base socket.

§150(k)6: Lighting integral to exhaust fans, in rooms other than kitchens, shall meet the applicable requirements of §150(k).

§150(k)7: All switching devices and controls shall meet the requirements of §150(k)7.

§150(k)8: A minimum of 50 percent of the total rated wattage of permanently installed lighting in kitchens shall be high efficacy. EXCEPTION: Up to 50 watts for dwelling units less than or equal to 2,500 ft₂ or 100 watts for dwelling units larger than 2,500 ft₂ may be exempt from the 50% high efficacy requirement when: all low efficacy luminaires in the kitchen are controlled by a manual on occupant sensor, dimmer, energy management system (EMCS), or a multi-scene programmable control system; and all permanently installed luminaries in garages, laundry rooms, closets greater than 70 square feet, and utility rooms are high efficacy and controlled by a manual-on occupant sensor.

§150(k)9: Permanently installed lighting that is internal to cabinets shall use no more than 20 watts of power per linear foot of illuminated cabinet.

MANDATORY MEASURES SUMMARY: Residential	(Page 3 of 3)	MF-1R
Project Name		Date
2-Unit Condo (15%) All ECM's		10/16/2010

§150(k)10: Permanently installed luminaires in bathrooms, attached and detached garages, laundry rooms, closets and utility rooms shall be high efficacy.

EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by a manual-on occupant sensor certified to comply with the applicable requirements of §119.

EXCEPTION 2: Permanently installed low efficacy luminaires in closets less than 70 square feet are not required to be controlled by a manual-on occupancy sensor.

§150(k)11: Permanently installed luminaires located in rooms or areas other than in kitchens, bathrooms, garages, laundry rooms, closets, and utility rooms shall be high efficacy luminaires. EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided they are controlled by either a dimmer switch that complies with the applicable requirements of §119, or by a manual-on occupant sensor that complies with the applicable requirements of §119. EXCEPTION 2: Lighting in detached storage building less than 1000 square feet located on a residential site is not required to comply with §150(k)11.

§150(k)12: Luminaires recessed into insulated ceilings shall be listed for zero clearance insulation contact (IC) by Underwriters Laboratories or other nationally recognized testing/rating laboratory; and have a label that certifies the lumiunaire is airtight with air leakage less then 2.0 CFM at 75 Pascals when tested in accordance with ASTM E283; and be sealed with a gasket or caulk between the luminaire housing and ceiling.

§150(k)13: Luminaires providing outdoor lighting, including lighting for private patios in low-rise residential buildings with four or more dwelling units, entrances, balconies, and porches, which are permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy. EXCEPTION 1: Permanently installed outdoor low efficacy luminaires shall be allowed provided that they are controlled by a manual on/off switch, a motion sensor not having an override or bypass switch that disables the motion sensor, and one of the following controls: a photocontrol not having an override or bypass switch that disables the photocontrol; OR an astronomical time clock not having an override or bypass switch that disables the astronomical time clock; OR an energy management control system (EMCS) not having an override or bypass switch that allows the luminaire to be always on EXCEPTION 2: Outdoor luminaires used to comply with Exception1 to §150(k)13 may be controlled by a temporary override switch which bypasses the motion sensing function provided that the motion sensor is automatically reactivated within six hours. EXCEPTION 3: Permanently installed luminaires in or around swimming pool, water features, or other location subject to Article 680 of the California Electric Code need not be high efficacy luminaires.

§150(k)14: Internally illuminated address signs shall comply with Section 148; OR not contain a screw-base socket, and consume no more than five watts of power as determined according to §130(d).

§150(k)15: Lighting for parking lots and carports with a total of for 8 or more vehicles per site shall comply with the applicable requirements in Sections 130, 132, 134, and 147. Lighting for parking garages for 8 or more vehicles shall comply with the applicable requirements of Sections 130, 131, 134, and 146.

§150(k)16: Permanently installed lighting in the enclosed, non-dwelling spaces of low-rise residential buildings with four or more dwelling units shall be high efficacy luminaires. EXCEPTION: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by an occupant sensor(s) certified to comply with the applicable requirements of §119.

Project Name -Unit Condo (15%) All EC	CM's						16/2010
System Name Init A System (80% to 95	%)						Area
ENGINEERING CHECKS	70)	CVCTEM LOAD					2,544
	4	SYSTEM LOAD	2011	2221112		2011 11	
lumber of Systems	1-		CFM	COOLING P	Latent	CFM	TG. PEAK Sensible
leating System	38.000	Total Room Loads	1,985		3,320	690	
Output per System	38,000	Return Vented Lighting	1,905	40,993	3,320	030	25,527
Total Output (Btuh)	14.9	Return Air Ducts		2,107			1,24
Output (Btuh/sqft)	14.9	Return Fan		2,107			1,24
Cooling System	0		0	0	0	0	
Output per System	0	Ventilation	U	0	υĮ	0	
Total Output (Btuh)		Supply Fan					4 244
Total Output (Tons)	0.0	Supply Air Ducts		2,107			1,24
Total Output (Btuh/sqft)	0.0	TOTAL 0//07514 : 0 : 5		54 005	2 222		00.000
Total Output (sqft/Ton)	0.0	TOTAL SYSTEM LOAD		51,207	3,320		28,009
Air System							
CFM per System	1,995			1	1		
Airflow (cfm)	1,995	Carrier Corp. 58MXB040-12x		0	0		38,000
Airflow (cfm/sqft)	0.78						
Airflow (cfm/Ton)	0.0					_	
Outside Air (%)	0.0 %	Total Adjusted System Output		0	0		38,000
Outside Air (cfm/sqft)	0.00	(Adjusted for Peak Design conditions)					
lote: values above given at ARI		TIME OF SYSTEM PEAK (Airstream Temperatures at Time of			Aug 3 PM		Jan 1 AN
Outside Air 0 cfm	69 °F Heating (Coil Supply Fan 1,995 cfm	105 °F →		RC	ОМ	04 °F
OOLING SYSTEM PSYCHRO 4 / 69 °F Outside Air 0 cfm		Airstream Temperatures at Time of 1/63 °F 55 / 54 °F 55 / 55 / 54 °F 55 / 55 / 55 / 55 / 55 / 55 / 55 / 5		Peak)	6 RC	ОМ	/ 54 °F / 63 °F

ystem Name nit B System (80% to 95	CM's						16/2010
	5%)						Area
NGINEERING CHECKS	70)	SYSTEM LOAD					2,658
	4	STSTEMILOAD	2011	00011110	FA1	0011 11	TO DE 41/
lumber of Systems	1		CFM	COOLING P	Latent	CFM	TG. PEAK Sensible
leating System	38.000	Total Room Loads	2,007	Sensible 47,481	3,361	729	
Output per System	38,000	Return Vented Lighting	2,007	0	3,301	123	26,953
Total Output (Btuh)	14.3	Return Air Ducts		2,129			1,310
Output (Btuh/sqft)	14.3	Return Fan		2,129			1,31
Cooling System	0		0	0	0	0	,
Output per System	0	Ventilation	U	0	υĮ	0	
Total Output (Btuh)		Supply Fan					4 24
Total Output (Tons)	0.0	Supply Air Ducts		2,129			1,310
Total Output (Btuh/sqft)	0.0	TOTAL 0//07514 : 0 : 5			2 224		00.57
Total Output (sqft/Ton)	0.0	TOTAL SYSTEM LOAD		51,740	3,361		29,57
ir System	4.00-						
CFM per System	1,995			_			
Airflow (cfm)	·	Carrier Corp. 58MXB040-12x		0	0		38,000
Airflow (cfm/sqft)	0.75					_	
Airflow (cfm/Ton)	0.0						
Outside Air (%)	0.0 %	Total Adjusted System Output (Adjusted for Peak Design conditions)		0	0		38,000
Outside Air (cfm/sqft)	0.00	(Adjusted for Feak Design Conditions)					
ote: values above given at ARI		TIME OF SYSTEM PEAK Airstream Temperatures at Time of	411 .1		Aug 3 PM		Jan 1 AN
Outside Air 0 cfm	Heating C	Coil Supply Fan 1,995 cfm	105 °F →		RC	ОМ	04 °F
OOLING SYSTEM PSYCHR 4 / 69 °F Outside Air 0 cfm	-	Airstream Temperatures at Time of 163 °F 55 / 54 °F 55 / 5 / 5 / 5 / 5 / 5 / 5 / 5 / 5 / 5		Peak) 42.3 %	6 RC	ОМ	/ 54 °F / 63 °F

ENERGY USE AND COST SUMMARY

ECON-1

2-Unit Condo (15%) All ECM's

 CO_2

1,124 lbs/yr

Date 10/16/2010

	Rate: SCE	GS-1			Fuel Type: Electricity						
		STANDARD)		PROPOSED)		MARGIN			
	Energy Use (kWh)	Peak Demand (kW)	Cost (\$)	Energy Use (kWh)	Peak Demand (kW)	Cost (\$)	Energy Use (kWh)	Peak Demand (kW)	Cost (\$)		
Jan	212	2	31	210	2	31	2	0	0		
Feb	178	2	29	185	4	29	-7	-1	0		
Mar	193	2	30	194	2	30	-2	0	0		
Apr	137	2	27	139	3	27	-3	-1	0		
May	95	2	25	94	2	25	1	0	0		
Jun	41	3	22	44	4	22	-3	-2	0		
Jul	44	3	22	46	4	22	-2	-1	0		
Aug	47	4	23	48	4	23	-1	0	0		
Sep	62	5	23	66	5	23	-4	0	0		
Oct	40	0	22	41	0	22	-1	0	0		
Nov	117	2	26	123	3	26	-6	-1	0		
Dec	231	4	32	246	5	32	-15	-1	-1		
Year	1,396	5	311	1,437	5	313	-40	0	-2		

Rate: SoCal GN-10 Fuel Type: Natural Gas

lbs/yr

1,157

		STANDARD)		PROPOSED			MARGIN	
	Energy Use (therms)	Peak Demand (kBtu/hr)	Cost (\$)	Energy Use (therms)	Peak Demand (kBtu/hr)	Cost (\$)	Energy Use (therms)	Peak Demand (kBtu/hr)	Cost (\$)
Jan	178	141	59	142	125	47	36	16	12
Feb	149	131	49	120	117	40	29	14	10
Mar	164	118	54	133	103	44	31	15	10
Apr	120	120	39	96	98	32	23	22	8
May	91	137	30	70	110	23	20	27	7
Jun	46	17	15	34	23	11	11	-5	4
Jul	46	13	15	34	18	11	12	-5	4
Aug	46	12	15	34	12	11	12	1	4
Sep	44	23	15	33	34	11	11	-11	4
Oct	48	36	16	36	31	12	12	5	4
Nov	104	121	34	83	107	27	21	14	7
Dec	184	170	61	148	149	49	36	21	12
Year	1,218	170	401	963	149	317	255	21	84
CO_2	14,253	lbs/vr		11,268	lbs/yr		2,986	lbs/yr	

Annual Totals	Energy	Demand	Cost	Cost/sqft	Virtual Rate
Electricity	1,437 kWh	5 kW	\$ 313	\$ 0.06 / sqft	\$ 0.22 / kWh
Natural Gas	963 therms	149 kBtu/hr	\$ 317	\$ 0.06 / sqft	\$ 0.33 /therm
		Total	\$ 630	\$ 0.12 /sqft	

Avoided CO₂ Emissions:

2,953 lbs/yr

-32 lbs/yr

EnergyPro 5.1 by EnergySoft

User Number: 2100

RunCode: 2010-10-16T18:46:2

ID: 8261R

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LIFE CYCLE COSTING SUMMARY

LCC-1

Project Name LCC for 2-Unit Condo to 15% - 10 year

10/19/2010

ANNUAL ENERGY USE AND COST

			Electricity		Natural	Gas	
Option	Description	Consumption (kWh)	Demand (kW)	Cost (\$)	Consumption (therms)	Cost (\$)	Simple Payback (years)
Base	2-Unit Condo BASE CASE	1,503	6	\$317	1,226	\$403	N/A
1	ECM-6 Quality Insul. Install. (Needs HERS)	1,428	5	\$313	1,170	\$385	14.8
2	ECM-8 - Furnace upgrade 80% to 95%: 8.0%	1,492	6	\$316	1,100	\$362	14.3
3	2-Unit Condo All ECM's: 16.5%	1,400	5	\$312	936	\$308	9.3

LIFE CYCLE COST PRESENT VALUE

Option	Initial Cost	Utility Incentive	Annual Recurring Costs	Electricity Costs	Natural Gas Costs	Non Annual Recurring OM&R Cost	Replacem. Costs	Residual Value	Total LCC	Savings
Base	\$0	\$0	\$0	\$2,699	\$3,917	\$0	\$0	\$0	\$6,617	\$0
1	\$330	\$0	\$0	\$2,668	\$3,736	\$0	\$0	\$0	\$6,734	(\$117)
2	\$600	\$0	\$0	\$2,695	\$3,514	\$0	\$0	\$0	\$6,808	(\$192)
3	\$930	\$0	\$0	\$2,656	\$2,991	\$0	\$0	\$0	\$6,577	\$40

Study Parameters

Study Period: 10

years

Real Discount Rate: 3.0 %

☑ DOE/FEMP Escalation Rates

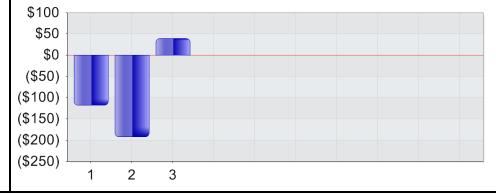
Region: Western US
Fuel Sector: Commercial

☐ Uniform Escalation Rates

EnergyLCC 5.1 by EnergySoft

Electricity: N/A
Natural Gas: N/A





1 of 1

BUILDING ENERGY ANALYSIS REPORT

PROJECT:

The Strand SFR (0.0%) BASE CASE 3516 The Strand Manhattan Beach, CA 90266

Project Designer:

Sexton Homes PO Box 1795 Manhattan Beach, CA 90267 (310) 545-3432

Report Prepared by:

Rick Newton NEWTON ENERGY 1401 19th Street Manhattan Beach, CA 90266 310 375-2699



Job Number:

7273R

Date:

10/13/2010

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2008 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

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Form MF-1R Mandatory Measures Summary	10
HVAC System Heating and Cooling Loads Summary	13
Form ECON-1 Energy Use and Cost Summary	14
Form UTIL-1R Utility Incentive Worksheet	15

EnergyPro 5.1 by EnergySoft Job Number: ID: 7273R User Number: 2100

PERF	ORMANO	CE CE	RTIFICA	TE: F	Resid	ential			(Part 1	of 5)	CF-1R
Project Na		22() 2.4		Build	ding Type	•	•		Addition Alone	·····································	Date
he Str	and SFR (0.0	0%) BA	SE CASE	Cali	fornia En	ergy Clima	ti Family		Existing+ Additio	Addition	# of Stories
•	he Strand M	lanhatta	an Beach			ate Zon		Total	5,551	n/a	3
IELI	D INSPEC	TION	ENERG	Y CHE	CKLI	ST					
l Yes	□ No HE	ERS M	easures	If Yes,	A CF-	4R mus	st be p	rovid	ed per Part	2 of 5 of tl	his form.
1 Yes	□ No Sp	ecial F	eatures	If Yes,	see P	art 2 of	5 of th	nis fo	rm for details	S.	
NSUL	ATION			<u> </u>		Area		ecial			
		/ ре		Cav	rity	(ft ²)	•		s (see Part	2 of 5)	Status
oof	Wood Framed I	Rafter		R-30		2,722			`		New
oor	Wood Framed	w/o Crawl	Space	R-30		656					New
all	Wood Framed			R-13		4,877					New
oor	Opaque Door			None		23					New
ab	Unheated Slab-	on-Grade		None		2,115	Perim :	= 242'			New
/allBG	Hollow Unit Ma	sonry		None		1,419	Int=R-1	13.0 De _l	oth = 30.000"		New
	STRATION	-142	U-	CHCC	0,404	hana	C: 4~t		Exterior		Ctatus
	ation Are	a(ft²)		SHGC	Over	nang	Sidef	ins	Shades		Status
ylight		12.6	0.370	0.29	none		none		None		New
cylight		6.3	0.370	0.29	none		none		None		New
ylight		6.3	0.370	0.29	none		none		None None		New New
ylight ft (W)		347.0	0.370	0.29	none		none		Bug Screen		New
ear (N)		330.0	0.370	0.32	none		none		Bug Screen		New
ght (E)		77.0	0.370	0.32	none		none		Bug Screen		New
ont (S)		288.0	0.370	0.32	none		none		Bug Screen		New
ight (E)		36.0	0.340	0.33	none		none		Bug Screen		New
_	SYSTEMS		Min. Ef	f Co	oling		Min	ı. Eff	Tho	rmostat	Status
Qty.	Heating Central Furnace		81% AFUE		Cooling			SEER	Setback		New
	Central Furnace		0178 AT 0L	_ 700	Cooming		13.0	OLLIN	Selback		14611
	DISTRIBUT	TION								Ouct	
_ocati	ion	He	ating	Co	oling	Duc	t Loca	ation	F	R-Value	Status
hole Ho	use Systems	Ducted	1	Duct	ted	Attic, C	eiling Ins	s, vented	d 4	1.2	New
VATE	R HEATING	3									
	Туре		Ga	llons	Min.	Eff	Distri	butio	n		Status
1	Small Gas		65		0.58		Kitchen	Pipe Ins	3		New
nergyPr	o 5.1 by EnergyS	oft Use	er Number: 2100	0 Ru	nCode: 2	2010-10-13	T08:02:3	33	ID: 7273R		Page 3 of 15

PERFORMANCE CERTIFICATE:	Residential	(Part 2 of 5)	CF-1R
Project Name The Strand SFR (0.0%) BASE CASE	Building Type	☐ Addition Alone ☐ Existing+ Addition/Alteration	Date 10/13/2010
SPECIAL FEATURES INSPECTION The enforcement agency should pay special attention justification and documentation, and special verification determines the adequacy of the justification, and may the special justification and documentation submitted.	n to the items specified in this cho on to be used with the performar or reject a building or design that o	nce approach. The enforcement ag	gency
The HVAC System copy of Carrier Corp. 48HJD0053 does n		rification is not necessary.	
HERS REQUIRED VERIFICATION Items in this section require field testing and/or very learning and the section require field testing and the section requires the section r	verification by a certified HER		eceive a
completed CF-4R form for each of the measures Compliance credit for quality installation of insulation has been			
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certified HERS rater must visually verify the installation of all The HVAC System Whole House Systems incorporates HEF		d verification and diagnostic testing is	required to
verify that duct leakage meets the specified criteria.			
EnergyPro 5.1 by EnergySoft	RunCode: 2010-10-13T08:02:33	ID: 7273R	Page 4 of 15

Project Name The Strand SF ANNUAL ENEF			OAIL.	Residen	tiai	(r a	rt 3 of 5)	CF-1R
				Building Type	☑ Single Family	☐ Addition Al		Date
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MANDATORY MEASURES SUMMARY: Residential

(Page 1 of 3)

MF-1R

Proiect Name

The Strand SFR (0.0%) BASE CASE

10/13/2010

NOTE: Low-rise residential buildings subject to the Standards must comply with all applicable mandatory measures listed, regardless of the compliance approach used. More stringent energy measures listed on the Certificate of Compliance (CF-1R, CF-1R-ADD, or CF-1R-ALT Form) shall supersede the items marked with an asterisk (*) below. This Mandatory Measures Summary shall be incorporated into the permit documents, and the applicable features shall be considered by all parties as minimum component performance specifications whether they are shown elsewhere in the documents or in this summary. Submit all applicable sections of the MF-1R Form with plans.

Building Envelope Measures:

- §116(a)1: Doors and windows between conditioned and unconditioned spaces are manufactured to limit air leakage.
- §116(a)4: Fenestration products (except field-fabricated windows) have a label listing the certified U-Factor, certified Solar Heat Gain Coefficient (SHGC), and infiltration that meets the requirements of §10-111(a).
- §117: Exterior doors and windows are weather-stripped; all joints and penetrations are caulked and sealed.
- §118(a): Insulation specified or installed meets Standards for Insulating Material. Indicate type and include on CF-6R Form.
- §118(i): The thermal emittance and solar reflectance values of the cool roofing material meets the requirements of §118(i) when the installation of a Cool Roof is specified on the CF-1R Form.
- *§150(a): Minimum R-19 insulation in wood-frame ceiling or equivalent U-factor.
- §150(b): Loose fill insulation shall conform with manufacturer's installed design labeled R-Value.
- *§150(c): Minimum R-13 insulation in wood-frame wall or equivalent U-factor.
- *§150(d): Minimum R-13 insulation in raised wood-frame floor or equivalent U-factor.
- §150(f): Air retarding wrap is tested, labeled, and installed according to ASTM E1677-95(2000) when specified on the CF-1R Form.
- §150(g): Mandatory Vapor barrier installed in Climate Zones 14 or 16.
- §150(l): Water absorption rate for slab edge insulation material alone without facings is no greater than 0.3%; water vapor permeance rate is no greater than 2.0 perm/inch and shall be protected from physical damage and UV light deterioration.

Fireplaces, Decorative Gas Appliances and Gas Log Measures:

- §150(e)1A: Masonry or factory-built fireplaces have a closable metal or glass door covering the entire opening of the firebox.
- §150(e)1B: Masonry or factory-built fireplaces have a combustion outside air intake, which is at least six square inches in area and is equipped with a with a readily accessible, operable, and tight-fitting damper and or a combustion-air control device.
- §150(e)2: Continuous burning pilot lights and the use of indoor air for cooling a firebox jacket, when that indoor air is vented to the outside of the building, are prohibited.

Space Conditioning, Water Heating and Plumbing System Measures:

- §110-§113: HVAC equipment, water heaters, showerheads, faucets and all other regulated appliances are certified by the Energy Commission.
- §113(c)5: Water heating recirculation loops serving multiple dwelling units and High-Rise residential occupancies meet the air release valve, backflow prevention, pump isolation valve, and recirculation loop connection requirements of §113(c)5.
- §115: Continuously burning pilot lights are prohibited for natural gas: fan-type central furnaces, household cooking appliances (appliances with an electrical supply voltage connection with pilot lights that consume less than 150 Btu/hr are exempt), and pool and spa heaters.
- §150(h): Heating and/or cooling loads are calculated in accordance with ASHRAE, SMACNA or ACCA.
- §150(i): Heating systems are equipped with thermostats that meet the setback requirements of Section 112(c).
- §150(j)1A: Storage gas water heaters rated with an Energy Factor no greater than the federal minimal standard are externally wrapped with insulation having an installed thermal resistance of R-12 or greater.
- §150(j)1B: Unfired storage tanks, such as storage tanks or backup tanks for solar water-heating system, or other indirect hot water tanks have R-12 external insulation or R-16 internal insulation where the internal insulation R-value is indicated on the exterior of the tank.
- §150(j)2: First 5 feet of hot and cold water pipes closest to water heater tank, non-recirculating systems, and entire length of recirculating sections of hot water pipes are insulated per Standards Table 150-B.
- §150(j)2: Cooling system piping (suction, chilled water, or brine lines), and piping insulated between heating source and indirect hot water tank shall be insulated to Table 150-B and Equation 150-A.
- §150(j)2: Pipe insulation for steam hydronic heating systems or hot water systems >15 psi, meets the requirements of Standards Table 123-A.
- §150(j)3A: Insulation is protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind.
- §150(j)3A: Insulation for chilled water piping and refrigerant suction lines includes a vapor retardant or is enclosed entirely in conditioned space.
- §150(j)4: Solar water-heating systems and/or collectors are certified by the Solar Rating and Certification Corporation.

MANDATORY MEASURES SUMMARY: Residential	(Page 2 of 3)	MF-1R
Project Name		Date
The Strand SFR (0.0%) BASE CASE		10/13/2010

§150(m)1: All air-distribution system ducts and plenums installed, are sealed and insulated to meet the requirements of CMC Sections 601, 602, 603, 604, 605 and Standard 6-5; supply-air and return-air ducts and plenums are insulated to a minimum installed level of R-4.2 or enclosed entirely in conditioned space. Openings shall be sealed with mastic, tape or other duct-closure system that meets the applicable requirements of UL 181, UL 181A, or UL 181B or aerosol sealant that meets the requirements of UL 723. If mastic or tape is used to seal openings greater than 1/4 inch, the combination of mastic and either mesh or tape shall be used

§150(m)1: Building cavities, support platforms for air handlers, and plenums defined or constructed with materials other than sealed sheet metal, duct board or flexible duct shall not be used for conveying conditioned air. Building cavities and support platforms may contain ducts. Ducts installed in cavities and support platforms shall not be compressed to cause reductions in the cross-sectional area of the ducts.

§150(m)2D: Joints and seams of duct systems and their components shall not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.

§150(m)7: Exhaust fan systems have back draft or automatic dampers.

§150(m)8: Gravity ventilating systems serving conditioned space have either automatic or readily accessible, manually operated dampers.

§150(m)9: Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material.

§150(m)10: Flexible ducts cannot have porous inner cores.

§150(o): All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2-2007 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. Window operation is not a permissible method of providing the Whole Building Ventilation required in Section 4 of that Standard.

Pool and Spa Heating Systems and Equipment Measures:

§114(a): Any pool or spa heating system shall be certified to have: a thermal efficiency that complies with the Appliance Efficiency Regulations; an on-off switch mounted outside of the heater; a permanent weatherproof plate or card with operating instructions; and shall not use electric resistance heating or a pilot light.

§114(b)1: Any pool or spa heating equipment shall be installed with at least 36" of pipe between filter and heater, or dedicated suction and return lines, or built-up connections for future solar heating.

§114(b)2: Outdoor pools or spas that have a heat pump or gas heater shall have a cover.

§114(b)3: Pools shall have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.

§150(p): Residential pool systems or equipment meet the pump sizing, flow rate, piping, filters, and valve requirements of §150(p).

Residential Lighting Measures:

§150(k)1: High efficacy luminaires or LED Light Engine with Integral Heat Sink has an efficacy that is no lower than the efficacies contained in Table 150-C and is not a low efficacy luminaire as specified by §150(k)2.

§150(k)3: The wattage of permanently installed luminaires shall be determined as specified by §130(d).

§150(k)4: Ballasts for fluorescent lamps rated 13 Watts or greater shall be electronic and shall have an output frequency no less than 20 kHz.

§150(k)5: Permanently installed night lights and night lights integral to a permanently installed luminaire or exhaust fan shall contain only high efficacy lamps meeting the minimum efficacies contained in Table 150-C and shall not contain a line-voltage socket or line-voltage lamp holder; OR shall be rated to consume no more than five watts of power as determined by §130(d), and shall not contain a medium screw-base socket.

§150(k)6: Lighting integral to exhaust fans, in rooms other than kitchens, shall meet the applicable requirements of §150(k).

§150(k)7: All switching devices and controls shall meet the requirements of §150(k)7.

§150(k)8: A minimum of 50 percent of the total rated wattage of permanently installed lighting in kitchens shall be high efficacy. EXCEPTION: Up to 50 watts for dwelling units less than or equal to 2,500 ft₂ or 100 watts for dwelling units larger than 2,500 ft₂ may be exempt from the 50% high efficacy requirement when: all low efficacy luminaires in the kitchen are controlled by a manual on occupant sensor, dimmer, energy management system (EMCS), or a multi-scene programmable control system; and all permanently installed luminaries in garages, laundry rooms, closets greater than 70 square feet, and utility rooms are high efficacy and controlled by a manual-on occupant sensor.

§150(k)9: Permanently installed lighting that is internal to cabinets shall use no more than 20 watts of power per linear foot of illuminated cabinet.

MANDATORY MEASURES SUMMARY: Residential	(Page 3 of 3)	MF-1R
Project Name		Date
The Strand SFR (0.0%) BASE CASE		10/13/2010

§150(k)10: Permanently installed luminaires in bathrooms, attached and detached garages, laundry rooms, closets and utility rooms shall be high efficacy.

EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by a manual-on occupant sensor certified to comply with the applicable requirements of §119.

EXCEPTION 2: Permanently installed low efficacy luminaires in closets less than 70 square feet are not required to be controlled by a manual-on occupancy sensor.

§150(k)11: Permanently installed luminaires located in rooms or areas other than in kitchens, bathrooms, garages, laundry rooms, closets, and utility rooms shall be high efficacy luminaires. EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided they are controlled by either a dimmer switch that complies with the applicable requirements of §119, or by a manual-on occupant sensor that complies with the applicable requirements of §119. EXCEPTION 2: Lighting in detached storage building less than 1000 square feet located on a residential site is not required to comply with §150(k)11.

§150(k)12: Luminaires recessed into insulated ceilings shall be listed for zero clearance insulation contact (IC) by Underwriters Laboratories or other nationally recognized testing/rating laboratory; and have a label that certifies the lumiunaire is airtight with air leakage less then 2.0 CFM at 75 Pascals when tested in accordance with ASTM E283; and be sealed with a gasket or caulk between the luminaire housing and ceiling.

§150(k)13: Luminaires providing outdoor lighting, including lighting for private patios in low-rise residential buildings with four or more dwelling units, entrances, balconies, and porches, which are permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy. EXCEPTION 1: Permanently installed outdoor low efficacy luminaires shall be allowed provided that they are controlled by a manual on/off switch, a motion sensor not having an override or bypass switch that disables the motion sensor, and one of the following controls: a photocontrol not having an override or bypass switch that disables the photocontrol; OR an astronomical time clock not having an override or bypass switch that disables the astronomical time clock; OR an energy management control system (EMCS) not having an override or bypass switch that allows the luminaire to be always on EXCEPTION 2: Outdoor luminaires used to comply with Exception1 to §150(k)13 may be controlled by a temporary override switch which bypasses the motion sensing function provided that the motion sensor is automatically reactivated within six hours. EXCEPTION 3: Permanently installed luminaires in or around swimming pool, water features, or other location subject to Article 680 of the California Electric Code need not be high efficacy luminaires.

§150(k)14: Internally illuminated address signs shall comply with Section 148; OR not contain a screw-base socket, and consume no more than five watts of power as determined according to §130(d).

§150(k)15: Lighting for parking lots and carports with a total of for 8 or more vehicles per site shall comply with the applicable requirements in Sections 130, 132, 134, and 147. Lighting for parking garages for 8 or more vehicles shall comply with the applicable requirements of Sections 130, 131, 134, and 146.

§150(k)16: Permanently installed lighting in the enclosed, non-dwelling spaces of low-rise residential buildings with four or more dwelling units shall be high efficacy luminaires. EXCEPTION: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by an occupant sensor(s) certified to comply with the applicable requirements of §119.

Project Name The Strand SFR (0.0%) B	ASE CAS	E					13/2010
System Name Vhole House Systems							Area 5,551
ENGINEERING CHECKS		SYSTEM LOAD					3,331
Number of Systems	2	3131EW LOAD	COIL	COOLING P	EAV	COII II.	TG. PEAK
Heating System			CFM	Sensible	Latent	CFM	Sensible
Output per System	57,000	Total Room Loads	2.104	51,421	3,373	1,647	61,357
Total Output (Btuh)	114,000		, -	0	-,-	•	0.,00
Output (Btuh/sqft)	20.5	Return Air Ducts		812			1,070
Cooling System		Return Fan		0			,
Output per System	0	Ventilation	0	0	0	0	(
Total Output (Btuh)	0	Supply Fan		0			(
Total Output (Tons)	0.0	Supply Air Ducts		812			1,070
Total Output (Btuh/sqft)	0.0	117					
Total Output (sqft/Ton)	0.0	TOTAL SYSTEM LOAD		53,045	3,373		63,49
Air System							
CFM per System	1,000	HVAC EQUIPMENT SELECTION					
Airflow (cfm)	2,000	copy of Carrier Corp. 48HJD0053		0	0		114,000
Airflow (cfm/sqft)	0.36						
Airflow (cfm/Ton)	0.0						
Outside Air (%)	0.0 %	Total Adjusted System Output		0	0		114,000
Outside Air (cfm/sqft)	0.00	(Adjusted for Peak Design conditions)				' <u></u>	
Note: values above given at ARI	conditions	TIME OF SYSTEM PEAK			Aug 3 PM		Jan 1 AN
Outside Air O cfm Supply Fan 2,000 cfm	Heating (105 °F Coil	→		RC	ОМ	05 °F 70 °F
OUTSIDE AIR OUTSID		Airstream Temperatures at Time of 3 / 62 °F 55 / 54 °F Cooling Coil	Cooling F	Peak)	a RC	ОМ	/ 54 °F / 63 °F

ENERGY USE AND COST SUMMARY

ECON-1

Project Name The Strand SFR (0.0%) BASE CASE

41

64

147

819 | Ibs/yr

1,017

Oct

Nov

Dec

Year

 CO_2

8

4

7

9

22

23

27

293

Date 10/13/2010

	Rate: SCE	GS-1		Fuel Type: Electricity								
		STANDARD)		PROPOSED	١		MARGIN				
	Energy Use (kWh)	Peak Demand (kW)	Cost (\$)	Energy Use (kWh)	Peak Demand (kW)	Cost (\$)	Energy Use (kWh)	Peak Demand (kW)	Cost (\$)			
Jan	110	2	26	112	2	26	-3	0	0			
Feb	118	6	26	109	6	26	10	0	0			
Mar	96	5	25	99	4	25	-3	1	0			
Apr	87	5	24	79	6	24	8	-1	0			
May	34	1	22	37	1	22	-2	0	0			
Jun	79	8	24	86	9	24	-7	-1	0			
Jul	49	8	23	47	8	23	2	0	0			
Aug	56	7	23	59	8	23	-3	0	0			
Sep	136	9	27	122	8	26	14	1	1			

37

64

145

994

7

4

7

9

22

23

27

292

4

0

2

23

19 lbs/yr

0

0

0

0

0

0

0

1

800 lbs/yr Rate: SoCal GN-10 Fuel Type: Natural Gas

	Hate. 666	ar 011-10					Tuci Type: Matarar eas			
		STANDARD)		PROPOSED			MARGIN		
	Energy Use (therms)	Peak Demand (kBtu/hr)	Cost (\$)	Energy Use (therms)	Peak Demand (kBtu/hr)	Cost (\$)	Energy Use (therms)	Peak Demand (kBtu/hr)	Cost (\$)	
Jan	90	127	30	89	123	29	1	4	0	
Feb	71	118	23	71	108	23	-1	10	0	
Mar	74	105	24	76	96	25	-2	8	-1	
Apr	49	95	16	51	88	17	-2	6	-1	
May	34	89	11	35	83	12	-1	6	0	
Jun	21	6	7	21	6	7	0	0	0	
Jul	22	6	7	21	6	7	0	0	0	
Aug	21	6	7	21	6	7	0	0	0	
Sep	21	6	7	21	6	7	0	0	0	
Oct	22	29	7	22	33	7	0	-4	0	
Nov	47	108	15	47	99	16	-1	9	0	
Dec	97	125	32	97	115	32	0	10	0	
Year	568	127	187	573	123	188	-4	4	-1	
CO ₂	6,647	lbs/yr		6,699	lbs/yr		-51	lbs/yr		

Annual Totals	Energy	Demand	Cost	Cost/sqft	Virtual Rate
Electricity	994 kWh	9 kW	\$ 292	\$ 0.05 / sqft	\$ 0.29 / kWh
Natural Gas	573 therms	123 kBtu/hr	\$ 188	\$ 0.03 / sqft	\$ 0.33 /therm
		Total	\$ 480	\$ 0.09 /sqft	

Avoided CO₂ Emissions:

-33 lbs/yr

EnergyPro 5.1 by EnergySoft

User Number: 2100

RunCode: 2010-10-13T08:02:3

ID: 7273R

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UTILITY INCENTIV	E WORKS	SHEET				UTIL-1R
Project Name	2405 0405					Date
The Strand SFR (0.0%) E Step 1 ANNUAL 1		USE (kBtu/sq	ift-vr\	Step 2	DERCENT F	10/13/2010 BELOW TITLE 24
ENERGY COMPONENT	Standard	Proposed	Margin	Step 2	I LITOLITI L	% Better than
Space Heating	8.75	8.92	-0.18	Margin	Standard	
Space Cooling	1.32	1.18	0.14	0.0		
Heat Rejection	0.00	0.00	0.00	Cooling		
Indoor Fans	1.77	1.78	-0.02	0.		08 = 3.8 %
Domestic Hot Water	6.96	6.90	0.06	Incentive Elig	vilidir	Yes No
Pumps	0.00	0.00	0.00		-	15%)
					`	30%)
TOTALS:	18.79	18.78	0.00	Conditioned	Floor Area =	5,551.0 ft²
				Number of B	edrooms =	5
Step 3 ANNUAL S	SITE ENERGY	USE				
Average 2pm - 5pm	Standard	Proposed	Margin	S	Single Orienta	ation
Peak Demand (kW)	1.8	1.5	0.3			
ENERGY COMPONENT	Stand Electricity	dard Natural Gas	Prop Electricity	osed Natural Gas	Electricity Mar	gin Natural Gas
	(kWh)	(therms)	(kWh)	(therms)	(kWh)	(therms)
Space Heating	0.00	307.70	0.00	314.33	0.00	-6.63
Space Cooling	301.08	0.00	263.20	0.00	37.88	0.00
Heat Rejection	0.00	0.00	0.00	0.00	0.00	0.00
Indoor Fans	715.76	0.00	730.65	0.00	-14.89	0.00
Domestic Hot Water	0.00	260.45	0.00	258.19	0.00	2.26
Pumps	0.00	0.00	0.00	0.00	0.00	0.00
TOTALS:	1,016.84	568.15	993.85	572.52	23.00	-4.37
		CENTIVE CAL	CULATION r than Title-24*	Incentive	Savings	
Potential incentives indicate on this report are available	ed		1 step 2)	Rate	(from Step	
only through the California	Electricit	y (kWh)	n/a)	a X	n/a = n/a
Advanced Homes Program	for			\$/kWh	kWh	
new construction and are	Electric	city (kW)	n/a	→ n/s	a X	n/a = n/a
NOT GUARANTEED. Proje must meet all other prograr	n			\$/kW	kW	
requirements to qualify.	Natı	ıral Gas	n/a	→ n/s		n/a = n/a
Potential incentives are				\$/therm	therm	
subject to program limitation	ns		Base Incentiv	е		= n/a
Pacific Gas and		Enora	u Star Incontiv	o	a x 10%	= n/a
PGS Electric Company		Energ	y Star Incentiv	e	a X 10%	= 11/a
	•	Green	Home Incentiv	e n/	a x 10%	= n/a
SOUTHERN CALIFORNIA	_					
EDISON	9	Compact	Home Incentiv	e n/	′a × 15%	= n/a
An EDISON INTERNATIONAL® Company		·				
onC [#]		Photo	voltaic Incentiv	e <i>n/</i>	a X	n/a = n/a
SINGE					DC Rating I	KW
A Sempra Energy uti	ility [®]	4			NSHP	= n/a
		coliforn	212			1,,,
The Gas		Callion	IId I		Total	= n/a
Company		aavan	cea non	nes"		
A Sempra Energy utility" EnergyPro 5.1.3. by EnergySoft	User Number: 1	2100 RunC o	ode: 2010-10-13T(08:02:33 ID: 7	*% Better than in the 273R	is equation is limited to 45% Page 15 of 15

BUILDING ENERGY ANALYSIS REPORT

PROJECT:

The Strand SFR (15%) All ECM's 3516 The Strand Manhattan Beach, CA 90266

Project Designer:

Sexton Homes PO Box 1795 Manhattan Beach, CA 90267 (310) 545-3432

Report Prepared by:

Rick Newton NEWTON ENERGY 1401 19th Street Manhattan Beach, CA 90266 310 375-2699



Job Number:

7273R

Date:

10/20/2010

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2008 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

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Form MF-1R Mandatory Measures Summary	10
HVAC System Heating and Cooling Loads Summary	13
Form ECON-1 Energy Use and Cost Summary	14

EnergyPro 5.1 by EnergySoft Job Number: ID: 7273R User Number: 2100

PERF	FORMAN	CE CE	RTIFICA	TE: F	Resid	ential			(Part 1	of 5)	CF-1R
Project N				Build	ding Type		•		Addition Alone	- / A I	Date
<i>he Sti</i> Project A	rand SFR (1	5%) All E	=CM's	Cali	fornia En	ergy Clima	ti Family		Existing+ Addition	Addition	# of Stories
	he Strand I	Manhatta	an Beach			ate Zon		Total	5,551	n/a	3
FIEL	D INSPEC	CTION	ENERGY	CHE	CKLI	ST					
1 Yes	s □ No H	ERS M	easures l	If Yes,	A CF-	4R mus	st be p	rovid	ed per Part :	2 of 5 of th	his form.
1 Yes	s □ No S	pecial F	eatures	If Yes,	see Pa	art 2 of	5 of th	nis for	rm for details	S.	
NSUI	ATION	•		,		Area		ecial			
		ype		Cav	ity	(ft ²)			s (see Part	2 of 5)	Status
oof	Wood Framed	,		R-30	•	1,990			\	<u> </u>	New
oor	Wood Framed	l w/o Crawl	Space	R-30		656					New
all	Wood Framed	1		R-19		4,877					New
oor	Opaque Door			None		23					New
oof	Wood Framed	Rafter		R-30		751					New
ab	Unheated Slat	b-on-Grade	!	None		2,115	Perim =	= 242'			New
/allBG	Hollow Unit Ma	asonry		None		1,419	Int=R-1	13.0 Dep	oth = 30.000"		New
	STRATION	_	U-		O	L	0:4-4		Exterior		04-4
	tation Are	ea(ft²)		HGC	Over	nang	Sidef	ins :	Shades		Status
kylight		0.0	0.370	0.29	none		none		None		New
cylight		6.3	0.370	0.29	none		none		None		New
ylight		0.0	0.370	0.29	none		none		None		New
ylight eft (W)		347.0	0.370	0.29	none		none		None Bug Screen		New New
ear (N)		330.0	0.370	0.32	none		none		Bug Screen		New
ight (E)		77.0	0.370	0.32	none		none		Bug Screen		New
ront (S)		288.0	0.370	0.32	none		none		Bug Screen		New
ight (E)		36.0	0.340	0.33	none		none		Bug Screen		New
	0.0075140										
IVAC Qty.	SYSTEMS Heating	5	Min. Eff	Co	oling		Min	. Eff	The	rmostat	Status
2	Central Furnace		95% AFUE	No	Cooling		13.0	SEER	Setback		New
IVAC	DISTRIBU	ITION							Г	Ouct	
ocat		_	ating	Co	oling	Duc	t Loca	ation		R-Value	Status
	ouse Systems	Ducted		Duct		Condit				1.2	New
_	R HEATIN	G		_							
રેty.	Туре		Gal	lons	Min.	Eff	Distri	butio	n		Status
1	Small Gas		75		0.57		Kitchen	Pipe Ins	3		New
	ro 5.1 by Energy	Soft Use	er Number: 2100	Ru	nCode: 1	2010-10-20	T08:24:2	28	ID: 7273R		Page 3 of 14

PERFORMANCE CERTIFICATE:	Residenti	al	(Part 2 of 5)	CF-1R
Project Name The Strand SFR (15%) All ECM's		Single Family Multi Family	☐ Addition Alone ☐ Existing+ Addition/Alteration	Date 10/20/2010
SPECIAL FEATURES INSPECTION The enforcement agency should pay special attention justification and documentation, and special verification determines the adequacy of the justification, and may the special justification and documentation submitted.	to the items spec on to be used with reject a building	cified in this che the performan	ce approach. The enforcement ag	gency
The HVAC System Carrier Corp. 58MXB040-12x does not in		em, field verificat	tion is not necessary.	
HERS REQUIRED VERIFICATION	N			
Items in this section require field testing and/or v completed CF-4R form for each of the measures				eceive a
Compliance credit for quality installation of insulation has been				
The HVAC System Whole House Systems has Ducts, Plenu must visually verify the installation of the HVAC unit and all I		nit located totally	within Conditioned space. A certified	d HERS rater
Whole House Systems includes verified duct systems that he for ducts in conditioned space and duct leakage is required.		ıtside conditions	equal to or less than 25 cfm. HERS t	field verification
,				
EnergyPro 5.1 by EnergySoft User Number: 2100	RunCode: 2010-10	-20T08:24:28	ID: 7273R	Page 4 of 14

	, _	<u>LNIII</u>	ICATE:	Residen	ılıaı	(Fa	rt 3 of 5)	CF-1R
Project Name		= 0		Building Type	☑ Single Family			Date
he Strand S					☐ Multi Family	☐ Existing+	Addition/Alteration	10/20/20
NNUAL ENE	RGY USE SI			A da martin				
TDV (LDt.)	Stand	aara Pr	roposed	Margin				
(KDlu/	/ft ² -yr)	8.75	5.87	2.88				
Space Heating		6.75 1.31	0.93	2.00 0.37				
Space Cooling	3	1.31 1.76	0.93 1.52	0.25				
⁻ ans Domestic Hot \	Motor	6.96	7.02	-0.06				
	vvaler	0.00	0.00	0.00				
umps -	Totals	18.77	15.34	3.43				
	r Than Stanc		13.34	3. 4 3 18.3 %				
В	UILDING	i CON	IPLIES	- HERS	VERIFIC	ATION	REQUIRED	
ilalia a Frant	Orientation		(SE)	142 deg	Est Malla/D	- of \\\/-		nestration
building Front				142 deg 1.00	Ext. Walls/R (SE)	oot vva	all Area 2.011	Area 288
lumber of Dw uel Available	U			iral Gas	(SE) (SW)		2,011 956	200 347
				nai Gas 656	(SW) (NW)		2.557	347
laised Floor A				.115	(NV) (NE)		2,557 454	330 113
lab on Grade				10.2	(NL) Roof		2,767	26
verage Ceilin enestration	Average U-	Eactor:		0.57	1,001		TOTAL:	1,104
enestration	Average 0-			0.36	_	enestration/C	_	19.9 %
EMARKS	Average of	ido.		7.30	1 '	enestration/C	of A Hallo.	19.9 /6
CM-3 - Wall Insul CM-8 - Furnace u CM-11 - Low Lea CM-13 - Eliminate	upgrade - AFUE akage Ducts in Co te three 6.3 sf sky	R-13 to R-19 80% to 95% onditioned S Vlights: 3.1%	6: 9.4% pace: HERS		in Base Case: Cost		require verification by	
CM-13 - Eliminate STATEMEN This certificate of comply with	upgrade - AFUE akage Ducts in Co e three 6.3 sf sky IT OF COM e of compliance Title 24, Part	R-13 to R-19 80% to 95% onditioned S vlights: 3.1% IPLIANC te lists the	Wall Batts: 9.4% Epace: HERS DE building formulations	eatures and specifications	in Base Case: Cost Decifications nees and Part 6 the	= \$0.0): 4.1%;		
CM-3 - Wall Insul CM-8 - Furnace L CM-11 - Low Lea CM-13 - Eliminate STATEMEN This certificate b comply with Efficiency Stan	upgrade - AFUE akage Ducts in Core three 6.3 sf sky IT OF COM e of compliance Title 24, Part andards of the	R-13 to R-19 80% to 95% onditioned S vlights: 3.1% IPLIANC se lists the ss 1 the Ac California	Wall Batts: 9 5: 9.4% pace: HERS building for diministrative Code of F	eatures and sp ve Regulations Regulations.	pecifications nee s and Part 6 the	= \$0.0): 4.1%; ded		
CM-3 - Wall Insul CM-8 - Furnace L CM-11 - Low Lea CM-13 - Eliminate STATEMEN This certificate o comply with Efficiency Stan	upgrade - AFUE akage Ducts in Core three 6.3 sf sky IT OF COM e of compliance Title 24, Part andards of the station author h	R-13 to R-19 180% to 95% onditioned Solights: 3.1% IPLIANC te lists the is 1 the Ac California	Wall Batts: 9 5: 9.4% pace: HERS building for diministrative Code of F	eatures and sp ve Regulations Regulations.	pecifications nee	= \$0.0): 4.1%; ded		
CM-3 - Wall Insul CM-8 - Furnace L CM-11 - Low Lea CM-13 - Eliminate CM-13 - Eliminate CM-13 - CM-13 - Eliminate CM-13 - Wall CM-13 - Wall CM-14 - CM-15	upgrade - AFUE akage Ducts in Code three 6.3 sf sky IT OF COM e of compliance Title 24, Part andards of the station author h	R-13 to R-19 80% to 95% conditioned S vlights: 3.1% IPLIANC te lists the ts 1 the Ac California Thereby cer	Wall Batts: 9 5: 9.4% pace: HERS building for diministrative Code of F	eatures and sp ve Regulations Regulations.	pecifications nee s and Part 6 the	= \$0.0): 4.1%; ded		
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	t Name						Ві	uilding T						dition Al				Date	
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Typ	e A	Area			Exterio	Frame	Interio	r Fran			_	Status	_	4				ation/Cor	nments
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Roof Roof		496 482	0.036							71	_	New	4.2.2					oor Zone	
Roof		502	0.036						_	61	_	New	4.2.2					oor Zone	
Floor		598	0.034							0 18		New	4.4.2	-A7			2nd Flo	oor Zone	
Wall		275	0.074						_			New	4.3.1					oor Zone	
Wall		873	0.074									New	4.3.1					oor Zone	
Wall Wall		252 843	0.074 0.074								_	New New	4.3.1 4.3.1					oor Zone oor Zone	
Floor		58	0.074						-		_	New	4.4.2					or Zone	
Wall		182	0.074						2			New	4.3.1					or Zone	
Wall		494	0.074						3.	41 9	90	New	4.3.1	-A5			1st Flo	or Zone	
Wall		123	0.074								_	New	4.3.1					or Zone	
Door		23	0.500 0.074								_	New	4.5.1					or Zone or Zone	
Wall Wall		89 593	0.074						_		_	New New	4.3.1					or Zone or Zone	
	FSTR				DETAIL	S			,	01 3	,0	74077	7.5.1	710			131110	or zone	
ID	Туре		Area	U-Fa			GC ²	Azn	ı St	atus		Gla	zing 7	vne			ocatio	on/Comm	nents
1	Skyligh		0.0	0.370			NFRC		51 Neu		Velu			Lowe2/	Ara		Floor Z		101110
2	Skyligh		6.3	0.370			NFRC		41 Neu					Lowe2/			Floor Z		
3	Skyligh		20.0	0.370			NFRC		71 Nev					Lowe2/			Floor Z		
4	Skyligh		0.0	0.370			NFRC		61 Neu					Lowe 2/			Floor Z		
5 6	Window Window		88.0 98.0	0.930 0.370		0.44	COG NFRC		51 Neи 41 Neи			G Azuria C 5300 V		Non-Me			Floor Z Floor Z		
7	Window		65.0	0.370			NFRC	_	71 Neu			C 5300 V					Floor Z		
8	Window		150.0	0.370			NFRC		61 Neu			5 5300 V					Floor Z		
9	Window	v	125.0	0.930		0.44	COG	2	51 Nev					Non-Me	tal D/	1st F	loor Zo	one	
10	Window		110.0	0.370			NFRC	_	41 Neи			C 5300 V	•				loor Zo		
	Window		36.0	0.340			NFRC	_	71 Neu			dersen P					loor Zo		
12 13	Window Window		12.0 60.0	0.370 0.370			NFRC NFRC		71 Neи 61 Neи			C 5300 V C 5300 V					loor Zo		
14	Window		134.0		COG	0.32	COG		51 Neu					Non-Me					
15	Window		122.0		NFRC		NFRC		41 Neu			5300 V					ement 2		
16	Window		78.0	0.370			NFRC		61 Neи			C 5300 V	/inyl/Lc	w-E		Base	ement 2	Zone	
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	2) SHO		ADING			rable irc	m Stand	ards, ivi	-RC = 1	abeled	vai	ue							
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-	t Name						Bui	lding Ty	rpe 🗹	Single	Fa	amily [⊒ Add	dition Al	one			Date		
			R (15%							Multi I	-ar	mily L	⊒ Exi	sting+ A	Additio	n/Alte	ratio	on 10/2	20/2010	
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Roof		751	0.035		LXIEIIO	i i i i aiiie	intenoi	TTAIII	_	_	_	New	4.2.2					ent Zone		
Slab		2,115	0.730									New	4.4.7					ent Zone		
Wall		152	0.074	R-19					25	51 9	00 1	New	4.3.1	-A5		Ва	Basement Zone			
Wall		454	0.074						34	11 9	_	New	4.3.1			Ва	asem	ent Zone		
Wall		287	0.074						16			New	4.3.1			Ba	asem	ent Zone		
Wall		260	0.074							_		New	4.3.1					ent Zone		
WallBo		80	0.076				13.0	Wood			_	New		-A9/4.3.				ent Zone		
WallBo		19	0.076		1	1	13.0	Wood			_	New		-A9/4.3.				ent Zone		
WallB0		12 70	0.076 0.076		-	-	13.0 13.0	Wood Wood		_		New New		-A9/4.3. -A9/4.3.				ent Zone ent Zone		
WallBG		51	0.076			+	13.0	Wood		_	_	New		-A9/4.3. -A9/4.3.				ent Zone		
WallBo		35	0.076				13.0	Wood		_	_	New		-A9/4.3.				ent Zone		
WallBo		56	0.076				13.0	Wood			_	New		-A9/4.3.				ent Zone		
WallBG		63	0.076				13.0	Wood		_		New		-A9/4.3.				ent Zone		
WallBo		14	0.076				13.0	Wood				New		-A9/4.3.				ent Zone		
WallBo		50	0.076				13.0	Wood		0 9	_	New	4.3.5	-A9/4.3.	13-A6	Ва	asem	ent Zone		
FEN	ESTR	ATIO	N SUR	FACE	DETAIL	.S														
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Project N							Buildi	ing Type				□ Ad	dition Al	one			ate
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Type WallBG	Area			Exterio	r Frame	9 Inte		rame <i>Vood</i>		Tilt	Statu New		4 5-A9/4.3.	12.46		ation/Co nent Zon	omments
WallBG	15	_				13.0		Vood	(New		5-A9/4.3. 5-A9/4.3.			nent Zon	
WallBG	61	_	None			13.0		Vood	(_	New		5-A9/4.3.			nent Zon	
WallBG	7	4 0.076	None			13.0) <i>V</i>	Vood	(90	New	4.3.	5-A9/4.3.	13-A6	Baser	nent Zon	е
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FENES	TRATI	ON SUR	FACE	DETAI	LS												
ID .	Туре	Area	U-Fa	actor ¹	SH	IGC^2		Azm	Stat	us	G	lazing	Туре		Locati	on/Com	ments
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(2)	SHGC	Гуре:	116-B	= Default	Table fro	m Sta	andard	s, NFR	C = La	beled V	alue						
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Project Name	4. 5 0()	A =				Building Type ☑ Single Family ☐ Addition Alone ☐ Multi Family ☐ Existing+ Addition/Alteration							Date	-				
The Strand SFR (I	⊥ Mu	iti Famii	y	LI EX	isting	+ Aa	aition/Ai	iteration	10/2	20/2010
BUILDING ZONE I	NFOR	WAII	ION							Floor A	roa (ft ² \						
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Whole House Systems		2nd Fl						2,008								19,277		
		1st Flo						1,428	_							14,708		
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HVAC SYSTEMS					10	tals		5,551	/	0			0		0			
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Whole House Systems		2		l Furnace		95% A				9 .)			SEER			- Tall 1 7 1 2	1	Vew
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System Name Whole House Systems		Ducte	Hea	ting		Coo Ducted	ling	Cor	L ndition	ouct Loc	ation		+	R-Va	4.2	Tested′ □		Status Vew
Whole House Systems		Ducte	<u>u</u>			Dacica		00/	idition	Cu					7.2		<u></u>	1011
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71 O Olimai Water i Todao	,	Ome	an Out		7 (10//	cirr ipc	1110			00,000	, ,		0.07		71/ U	17/4	<u></u>	1011
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			_	Hot W		Piping (ft)	Leng	ıth	L									
			iun			(11)			½" atio									
			Eff. Premium						Add ½" Insulation						Pipe	Pipe	9	Insul.
Control	Qty.	HP	_	Plenun	n O	utside	Bur	ried		S	yste	m Na	me		Length	Diame	ter	Thick.
					+		+											
EnergyPro 5.1 by Energ	vSoft	Hse	r Numb	er: 2100		RunC	ode: 1	2010-	10-20	T08:24:2	8	חו	: 7273	7			Par	ge 9 of 14

MANDATORY MEASURES SUMMARY: Residential

(Page 1 of 3)

MF-1R

Project Name

The Strand SFR (15%) All ECM's

10/20/2010

NOTE: Low-rise residential buildings subject to the Standards must comply with all applicable mandatory measures listed, regardless of the compliance approach used. More stringent energy measures listed on the Certificate of Compliance (CF-1R, CF-1R-ADD, or CF-1R-ALT Form) shall supersede the items marked with an asterisk (*) below. This Mandatory Measures Summary shall be incorporated into the permit documents, and the applicable features shall be considered by all parties as minimum component performance specifications whether they are shown elsewhere in the documents or in this summary. Submit all applicable sections of the MF-1R Form with plans.

Building Envelope Measures:

- §116(a)1: Doors and windows between conditioned and unconditioned spaces are manufactured to limit air leakage.
- §116(a)4: Fenestration products (except field-fabricated windows) have a label listing the certified U-Factor, certified Solar Heat Gain Coefficient (SHGC), and infiltration that meets the requirements of §10-111(a).
- §117: Exterior doors and windows are weather-stripped; all joints and penetrations are caulked and sealed.
- §118(a): Insulation specified or installed meets Standards for Insulating Material. Indicate type and include on CF-6R Form.
- §118(i): The thermal emittance and solar reflectance values of the cool roofing material meets the requirements of §118(i) when the installation of a Cool Roof is specified on the CF-1R Form.
- *§150(a): Minimum R-19 insulation in wood-frame ceiling or equivalent U-factor.
- §150(b): Loose fill insulation shall conform with manufacturer's installed design labeled R-Value.
- *§150(c): Minimum R-13 insulation in wood-frame wall or equivalent U-factor.
- *§150(d): Minimum R-13 insulation in raised wood-frame floor or equivalent U-factor.
- §150(f): Air retarding wrap is tested, labeled, and installed according to ASTM E1677-95(2000) when specified on the CF-1R Form.
- §150(g): Mandatory Vapor barrier installed in Climate Zones 14 or 16.
- §150(I): Water absorption rate for slab edge insulation material alone without facings is no greater than 0.3%; water vapor permeance rate is no greater than 2.0 perm/inch and shall be protected from physical damage and UV light deterioration.

Fireplaces, Decorative Gas Appliances and Gas Log Measures:

- §150(e)1A: Masonry or factory-built fireplaces have a closable metal or glass door covering the entire opening of the firebox.
- §150(e)1B: Masonry or factory-built fireplaces have a combustion outside air intake, which is at least six square inches in area and is equipped with a with a readily accessible, operable, and tight-fitting damper and or a combustion-air control device.
- §150(e)2: Continuous burning pilot lights and the use of indoor air for cooling a firebox jacket, when that indoor air is vented to the outside of the building, are prohibited.

Space Conditioning, Water Heating and Plumbing System Measures:

- §110-§113: HVAC equipment, water heaters, showerheads, faucets and all other regulated appliances are certified by the Energy Commission.
- §113(c)5: Water heating recirculation loops serving multiple dwelling units and High-Rise residential occupancies meet the air release valve, backflow prevention, pump isolation valve, and recirculation loop connection requirements of §113(c)5.
- §115: Continuously burning pilot lights are prohibited for natural gas: fan-type central furnaces, household cooking appliances (appliances with an electrical supply voltage connection with pilot lights that consume less than 150 Btu/hr are exempt), and pool and spa heaters.
- §150(h): Heating and/or cooling loads are calculated in accordance with ASHRAE, SMACNA or ACCA.
- §150(i): Heating systems are equipped with thermostats that meet the setback requirements of Section 112(c).
- §150(j)1A: Storage gas water heaters rated with an Energy Factor no greater than the federal minimal standard are externally wrapped with insulation having an installed thermal resistance of R-12 or greater.
- §150(j)1B: Unfired storage tanks, such as storage tanks or backup tanks for solar water-heating system, or other indirect hot water tanks have R-12 external insulation or R-16 internal insulation where the internal insulation R-value is indicated on the exterior of the tank.
- §150(j)2: First 5 feet of hot and cold water pipes closest to water heater tank, non-recirculating systems, and entire length of recirculating sections of hot water pipes are insulated per Standards Table 150-B.
- §150(j)2: Cooling system piping (suction, chilled water, or brine lines), and piping insulated between heating source and indirect hot water tank shall be insulated to Table 150-B and Equation 150-A.
- §150(j)2: Pipe insulation for steam hydronic heating systems or hot water systems >15 psi, meets the requirements of Standards Table 123-A.
- §150(j)3A: Insulation is protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind.
- §150(j)3A: Insulation for chilled water piping and refrigerant suction lines includes a vapor retardant or is enclosed entirely in conditioned space.
- §150(j)4: Solar water-heating systems and/or collectors are certified by the Solar Rating and Certification Corporation.

MANDATORY MEASURES SUMMARY: Residential	(Page 2 of 3)	MF-1R
Project Name		Date
The Strand SFR (15%) All ECM's		10/20/2010

§150(m)1: All air-distribution system ducts and plenums installed, are sealed and insulated to meet the requirements of CMC Sections 601, 602, 603, 604, 605 and Standard 6-5; supply-air and return-air ducts and plenums are insulated to a minimum installed level of R-4.2 or enclosed entirely in conditioned space. Openings shall be sealed with mastic, tape or other duct-closure system that meets the applicable requirements of UL 181, UL 181A, or UL 181B or aerosol sealant that meets the requirements of UL 723. If mastic or tape is used to seal openings greater than 1/4 inch, the combination of mastic and either mesh or tape shall be used

§150(m)1: Building cavities, support platforms for air handlers, and plenums defined or constructed with materials other than sealed sheet metal, duct board or flexible duct shall not be used for conveying conditioned air. Building cavities and support platforms may contain ducts. Ducts installed in cavities and support platforms shall not be compressed to cause reductions in the cross-sectional area of the ducts.

§150(m)2D: Joints and seams of duct systems and their components shall not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.

§150(m)7: Exhaust fan systems have back draft or automatic dampers.

§150(m)8: Gravity ventilating systems serving conditioned space have either automatic or readily accessible, manually operated dampers.

§150(m)9: Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material.

§150(m)10: Flexible ducts cannot have porous inner cores.

§150(o): All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2-2007 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. Window operation is not a permissible method of providing the Whole Building Ventilation required in Section 4 of that Standard.

Pool and Spa Heating Systems and Equipment Measures:

§114(a): Any pool or spa heating system shall be certified to have: a thermal efficiency that complies with the Appliance Efficiency Regulations; an on-off switch mounted outside of the heater; a permanent weatherproof plate or card with operating instructions; and shall not use electric resistance heating or a pilot light.

§114(b)1: Any pool or spa heating equipment shall be installed with at least 36" of pipe between filter and heater, or dedicated suction and return lines, or built-up connections for future solar heating.

§114(b)2: Outdoor pools or spas that have a heat pump or gas heater shall have a cover.

§114(b)3: Pools shall have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.

§150(p): Residential pool systems or equipment meet the pump sizing, flow rate, piping, filters, and valve requirements of §150(p).

Residential Lighting Measures:

§150(k)1: High efficacy luminaires or LED Light Engine with Integral Heat Sink has an efficacy that is no lower than the efficacies contained in Table 150-C and is not a low efficacy luminaire as specified by §150(k)2.

§150(k)3: The wattage of permanently installed luminaires shall be determined as specified by §130(d).

§150(k)4: Ballasts for fluorescent lamps rated 13 Watts or greater shall be electronic and shall have an output frequency no less than 20 kHz.

§150(k)5: Permanently installed night lights and night lights integral to a permanently installed luminaire or exhaust fan shall contain only high efficacy lamps meeting the minimum efficacies contained in Table 150-C and shall not contain a line-voltage socket or line-voltage lamp holder; OR shall be rated to consume no more than five watts of power as determined by §130(d), and shall not contain a medium screw-base socket.

§150(k)6: Lighting integral to exhaust fans, in rooms other than kitchens, shall meet the applicable requirements of §150(k).

§150(k)7: All switching devices and controls shall meet the requirements of §150(k)7.

§150(k)8: A minimum of 50 percent of the total rated wattage of permanently installed lighting in kitchens shall be high efficacy. EXCEPTION: Up to 50 watts for dwelling units less than or equal to 2,500 ft₂ or 100 watts for dwelling units larger than 2,500 ft₂ may be exempt from the 50% high efficacy requirement when: all low efficacy luminaires in the kitchen are controlled by a manual on occupant sensor, dimmer, energy management system (EMCS), or a multi-scene programmable control system; and all permanently installed luminaries in garages, laundry rooms, closets greater than 70 square feet, and utility rooms are high efficacy and controlled by a manual-on occupant sensor.

§150(k)9: Permanently installed lighting that is internal to cabinets shall use no more than 20 watts of power per linear foot of illuminated cabinet.

MANDATORY MEASURES SUMMARY: Residential	(Page 3 of 3)	MF-1R
Project Name		Date
The Strand SFR (15%) All ECM's		10/20/2010

§150(k)10: Permanently installed luminaires in bathrooms, attached and detached garages, laundry rooms, closets and utility rooms shall be high efficacy.

EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by a manual-on occupant sensor certified to comply with the applicable requirements of §119.

EXCEPTION 2: Permanently installed low efficacy luminaires in closets less than 70 square feet are not required to be controlled by a manual-on occupancy sensor.

§150(k)11: Permanently installed luminaires located in rooms or areas other than in kitchens, bathrooms, garages, laundry rooms, closets, and utility rooms shall be high efficacy luminaires. EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided they are controlled by either a dimmer switch that complies with the applicable requirements of §119, or by a manual-on occupant sensor that complies with the applicable requirements of §119. EXCEPTION 2: Lighting in detached storage building less than 1000 square feet located on a residential site is not required to comply with §150(k)11.

§150(k)12: Luminaires recessed into insulated ceilings shall be listed for zero clearance insulation contact (IC) by Underwriters Laboratories or other nationally recognized testing/rating laboratory; and have a label that certifies the lumiunaire is airtight with air leakage less then 2.0 CFM at 75 Pascals when tested in accordance with ASTM E283; and be sealed with a gasket or caulk between the luminaire housing and ceiling.

§150(k)13: Luminaires providing outdoor lighting, including lighting for private patios in low-rise residential buildings with four or more dwelling units, entrances, balconies, and porches, which are permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy. EXCEPTION 1: Permanently installed outdoor low efficacy luminaires shall be allowed provided that they are controlled by a manual on/off switch, a motion sensor not having an override or bypass switch that disables the motion sensor, and one of the following controls: a photocontrol not having an override or bypass switch that disables the photocontrol; OR an astronomical time clock not having an override or bypass switch that disables the astronomical time clock; OR an energy management control system (EMCS) not having an override or bypass switch that allows the luminaire to be always on EXCEPTION 2: Outdoor luminaires used to comply with Exception1 to §150(k)13 may be controlled by a temporary override switch which bypasses the motion sensing function provided that the motion sensor is automatically reactivated within six hours. EXCEPTION 3: Permanently installed luminaires in or around swimming pool, water features, or other location subject to Article 680 of the California Electric Code need not be high efficacy luminaires.

§150(k)14: Internally illuminated address signs shall comply with Section 148; OR not contain a screw-base socket, and consume no more than five watts of power as determined according to §130(d).

§150(k)15: Lighting for parking lots and carports with a total of for 8 or more vehicles per site shall comply with the applicable requirements in Sections 130, 132, 134, and 147. Lighting for parking garages for 8 or more vehicles shall comply with the applicable requirements of Sections 130, 131, 134, and 146.

§150(k)16: Permanently installed lighting in the enclosed, non-dwelling spaces of low-rise residential buildings with four or more dwelling units shall be high efficacy luminaires. EXCEPTION: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by an occupant sensor(s) certified to comply with the applicable requirements of §119.

he Strand SFR (15%) Al	I ECM's						20/2010
System Name Vhole House Systems							Area 5,551
ENGINEERING CHECKS		SYSTEM LOAD					0,001
	2	STOTEM LOAD	COIL	COOLING P	EAV	COII II.	TG. PEAK
lumber of Systems leating System			CFM	Sensible	Latent	CFM	Sensible
Output per System	38,000	Total Room Loads	1,963	48,546	3,373	1,508	56,76°
Total Output (Btuh)	76,000	Return Vented Lighting	1,000	0	0,010	.,000	30,70
Output (Btuh/sqft)	13.7	Return Air Ducts		0			
Cooling System	10.7	Return Fan		0			
Output per System	0	Ventilation	0	0	0	0	
Total Output (Btuh)	0	Supply Fan		0	<u> </u>		
Total Output (Tons)	0.0	Supply Air Ducts		0			
Total Output (Tons) Total Output (Btuh/sqft)	0.0	Supply All Ducts					•
Total Output (sqft/Ton)	0.0	TOTAL SYSTEM LOAD		48,546	3,373		56,76
Air System	0.0	TOTAL STSTEW LOAD		70,340	3,373		30,70
CFM per System	1,995	HVAC EQUIPMENT SELECTION					
	3,990			0	0		76,00
Airflow (cfm)	0.72	Carrier Corp. SciwABO40-12X				-	70,00
Airflow (cfm/sqft)	0.0					-	
Airflow (cfm/Ton)	0.0 %	Total Adjusted System Output		0	0	-	76,00
Outside Air (%)	0.00 %	Total Adjusted System Output (Adjusted for Peak Design conditions)		<u> </u>	U		70,00
Outside Air (cfm/sqft)		TIME OF CVCTEM DEAK			Aug 3 PM		Jan 1 Al
lote: values above given at ARI IEATING SYSTEM PSYCHRO		TIME OF SYSTEM PEAK (Airstream Temperatures at Time of	of Heating	Peak)	Aug 3 F W		Jan i Ai
Outside Air 0 cfm	70 °F Heating (105 °F Coil Supply Fan 3,990 cfm	105 °F →		RC	ОМ	05 °F
OOLING SYSTEM PSYCHR 4 / 69 °F Outside Air 0 cfm		Airstream Temperatures at Time of 3 / 62 °F 55 / 54 °F 55 °F 55 / 54 °F 55 °F 55 / 54 °F 55 °F		Peak)	RC	ОМ	/ 54 °F / 62 °F

ENERGY USE AND COST SUMMARY

ECON-1

The Strand SFR (15%) All ECM's

Date 10/20/2010

Rate: SCE GS-1 Fuel Type

		STANDARD			PROPOSED		MARGIN			
	Energy Use (kWh)	Peak Demand (kW)	Cost (\$)	Energy Use (kWh)	Peak Demand (kW)	Cost (\$)	Energy Use (kWh)	Peak Demand (kW)	Cost (\$)	
Jan	110	2	26	91	1	25	18	0	1	
Feb	118	6	26	86	5	24	32	1	2	
Mar	96	4	25	75	1	24	21	3	1	
Apr	86	5	24	66	5	23	20	0	1	
May	34	1	22	32	1	22	3	0	0	
Jun	79	8	24	74	8	24	5	0	0	
Jul	48	8	23	42	7	22	7	1	0	
Aug	56	7	23	49	7	23	6	1	0	
Sep	135	9	27	105	7	25	30	1	1	
Oct	41	8	22	33	6	22	8	2	0	
Nov	64	4	23	54	4	23	10	0	0	
Dec	147	7	27	115	6	26	32	1	2	
Year	1,014	9	293	822	8	283	191	1	9	
CO ₂	816	lbs/yr		662	lbs/yr		154	lbs/yr		

Rate: SoCal GN-10 Fuel Type: Natural Gas

		STANDARD)		PROPOSED	1	MARGIN				
	Energy Use (therms)	Peak Demand (kBtu/hr)	Cost (\$)	Energy Use (therms)	Peak Demand (kBtu/hr)	Cost (\$)	Energy Use (therms)	Peak Demand (kBtu/hr)	Cost (\$)		
Jan	90	127	30	67	94	22	23	33	8		
Feb	71	118	23	54	84	18	17	34	6		
Mar	74	105	24	57	75	19	17	30	5		
Apr	49	95	16	41	70	14	8	25	3		
May	34	89	11	31	65	10	4	24	1		
Jun	21	6	7	21	6	7	0	0	0		
Jul	22	6	7	22	6	7	0	0	0		
Aug	21	6	7	22	6	7	0	0	0		
Sep	21	6	7	21	6	7	0	0	0		
Oct	22	28	7	22	18	7	0	10	0		
Nov	47	108	15	39	81	13	7	28	2		
Dec	97	125	32	72	89	24	24	37	8		
Year	568	127	187	469	94	154	99	33	32		
					_						
CO ₂	6,648	lbs/yr		5,493	lbs/yr		1,156	lbs/yr			

Annual Totals	Energy	Demand	Cost	Cost/sqft		Virtual Rate	
Electricity	822 kWh	8 kW	\$ 283	\$	0.05 / sqft	\$	0.34 / kWh
Natural Gas	469 therms	94 kBtu/hr	\$ 154	\$	0.03 / sqft	\$	0.33 /therm
		Total	\$ 437	\$	0.08 /sqft		

Avoided CO₂ Emissions:

1,310 lbs/yr

LIFE CYCLE COSTING SUMMARY

Project Name

LLC for The Strand SFR 15% - Skylt. Downgrade

LCC-1

10/20/2010

ANNUAL ENERGY USE AND COST

			Electricity		Natural		
Option	Description	Consumption (kWh)	Demand (kW)	Cost (\$)	Consumption (therms)	Cost (\$)	Simple Payback (years)
Base	The Strand SFR BASE CASE	994	9	\$292	573	\$188	N/A
1	ECM-3 - Wall Insul. Upgrade to R-19: 9.1%	893	9	\$287	521	\$171	6.9
2	ECM-8 - Furnace upgrade (2)-AFUE 80%-95%: 9.	966	9	\$290	513	\$169	56.9
3	ECM-11 - Low Leak. Ducts in Cond. Space: 4.1%	935	8	\$289	552	\$182	0.0
4	ECM-13 - Eliminate (Downgrade) 3 Skylights	956	9	\$290	556	\$183	N/A
5	TOTLA: The Strand SFR (15%) All ECM's:	819	8	\$283	455	\$150	19.1

LIFE CYCLE COST PRESENT VALUE

Option	Initial Cost	Utility Incentive	Annual Recurring Costs	Electricity Costs	Natural Gas Costs	Non Annual Recurring OM&R Cost	Replacem. Costs	Residual Value	Total LCC	Savings
Base	\$0	\$0	\$0	\$5,763	\$4,577	\$0	\$0	\$0	\$10,341	\$0
1	\$150	\$0	\$0	\$5,665	\$4,168	\$0	\$0	\$0	\$9,983	\$357
2	\$1,200	\$0	\$0	\$5,736	\$4,098	\$0	\$0	\$0	\$11,034	(\$693)
3	\$0	\$0	\$0	\$5,706	\$4,416	\$0	\$0	\$0	\$10,122	\$219
4	(\$1,350)	\$0	\$0	\$5,726	\$4,446	\$0	\$0	\$0	\$8,823	\$1,518
5	\$900	\$0	\$0	\$5,594	\$3,638	\$0	\$0	\$0	\$10,132	\$209

Study Parameters

Study Period: 30

years

Real Discount Rate: 3.0 %

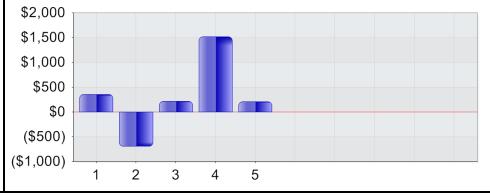
☑ DOE/FEMP Escalation Rates

Region: Western US
Fuel Sector: Commercial

☐ Uniform Escalation Rates

Electricity: *N/A*Natural Gas: *N/A*





EnergyLCC 5.1 by EnergySoft

1 of 1

BUILDING ENERGY ANALYSIS REPORT

PROJECT:

East Manhattan SFR (1.1%) BASE CASE 1647 Mathews Avenue Manhattan Beach, CA 90266

Project Designer:

2100 N. Sepulveda Blvd., #11 Manhattan Beach, CA 90266 (310) 379-5867

Report Prepared by:

Rick Newton NEWTON ENERGY 1401 19th Street Manhattan Beach, CA 90266 310 375-2699



Job Number:

8152R

Date:

10/13/2010

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2008 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

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HVAC System Heating and Cooling Loads Summary	12

EnergyPro 5.1 by EnergySoft Job Number: ID: 8152R User Number: 2100

PERF	FORMA	NCE CI	ERTIFICAT	ΓE: R	Reside	ential	_	_	(Part 1	of 5)	CF-1R
Project Na		SFR /1 10	6) BASE CAS		ding Type		gle Fami ti Family		ddition Alone xisting+ Addition	n/Alteration	Date 10/13/2010
roject A		SFK (1.17	6) BASE CAS		fornia Ene	ergy Clima	,		Cond. Floor Area	Addition	# of Stories
-		venue M	anhattan Bea			ate Zon			3,137	n/a	2
IELI	D INSPE	ECTION	I ENERGY	CHE	CKLI	ST					
] Yes	⊠ No	HERS N	leasures I	f Yes,	A CF-4	4R mus	st be p	rovide	ed per Part 2	2 of 5 of tl	his form.
2 Yes	s □ No	Special	Features I	f Yes,	see Pa	art 2 of	5 of th	nis for	m for details	S.	
NSUL	ATION	•				Area	Spe	ecial			
	ruction	Type		Cav	ity	(ft^2)	-		s (see Part 2	2 of 5)	Status
oor	Wood Fran	ned w/o Craw	l Space	R-19		404					New
oof	Wood Fran	ned Rafter		R-30		1,880					New
'all	Wood Fran	ned		R-13		2,707					New
ab	Unheated S	Slab-on-Grad	е	None		1,512	Perim =	= 160'			New
oor	Opaque Do	oor		None		21					New
FNF	STRATIC	N	U-						Exterior		
		Area(<i>ft²</i>)	_	HGC	Overl	nang	Sidefi		Shades		Status
kylight		36.0	0.390	0.29	none	9	none		None		New
ear (N)		181.5	0.330	0.31	none		none		Bug Screen		New
ont (S)		183.4	0.330	0.31	none		none		Bug Screen		New
ight (E)		46.7	0.330	0.31	none		none		Bug Screen		New
eft (W)		68.0	0.330	0.31	none		none		Bug Screen		New
ront (S)		84.0	0.330	0.31	6.0		none		Bug Screen		New
ight (E)		17.5	0.330	0.31	11.0		none		Bug Screen		New
ight (E)		16.0	0.330	0.31	3.5		none		Bug Screen		New
eft (W)		20.0	0.330	0.31	3.0		none		Bug Screen		New
HVAC	SYSTEM	//S									
Qty.	Heating		Min. Eff	Co	oling		Min	. Eff	Ther	mostat	Status
1	Central Furna	ace	90% AFUE	No	Cooling		13.0	SEER	Setback		New
1// ۷ С	DISTRIE	RIITION								ouct	
-ocati	_		eating	Co	oling	Duc	t Loca	ation		R-Value	Status
	use System	Ducte		Duct			eiling Ins			.2	New
			·-			7		,	·	·-	
VATE	R HEAT	ING									
Qty.	Type		Gall	ons	Min.	Eff	Distril	<u>bu</u> tio	n_		Status
1	Small Gas		75		0.58		Kitchen I	Pipe Ins			New
	ro 5.1 by Ener	cayCoff III	ser Number: 2100	Pu	nCodo: 2	010-10-13	T07·27·5	1	ID: 8152R		Page 3 of 12

PERFORMANCE CERTIFICATE:	Resider	ntial	(Part 2 of 5)	CF-1R
Project Name East Manhattan SFR (1.1%) BASE CASE	Building Type	☑ Single Family ☐ Multi Family	☐ Addition Alone ☐ Existing+ Addition/Alteration	Date 10/13/2010
SPECIAL FEATURES INSPECTION	ON CHEC	CKLIST		
The enforcement agency should pay special attention justification and documentation, and special verification determines the adequacy of the justification, and may the special justification and documentation submitted.	on to be used v reject a buildi	with the performan	ice approach. The enforcement ag	gency
The HVAC System CARRIER 58MSA060-12 does not includ		em, field verification	is not necessary.	
HERS REQUIRED VERIFICATION	N			
Items in this section require field testing and/or v completed CF-4R form for each of the measures	erification by			eceive a
EnergyPro 5.1 by EnergySoft User Number: 2100	RunCode: 201	0-10-13T07:27:51	ID: 8152R	Page 4 of 12

Project Name E ast Manhatta			<u>ICAIL</u>	: Residen	llai		Part 3 of 5)	CF-1R
-ast Manhatta				Building Type	☑ Single Family			Date
					☐ Multi Family	☐ Existir	ng+ Addition/Alteration	10/13/201
NNUAL ENER				Manain				
TDV (LDt./f		anaara F	Proposed	Margin				
(KDlu/I	t -yr)	7.60	0.07	0.50				
Space Heating		7.68	8.27	-0.59				
Space Cooling		1.27	0.55	0.72				
ans		1.92	1.91	0.01				
omestic Hot W	Vater	12.31	12.21	0.11				
umps		0.00	0.00	0.00				
	otals	23.19	22.94	0.25				
ercent Better				1.1 %				
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MANDATORY MEASURES SUMMARY: Residential

(Page 1 of 3)

MF-1R

Project Name

East Manhattan SFR (1.1%) BASE CASE

10/13/2010

NOTE: Low-rise residential buildings subject to the Standards must comply with all applicable mandatory measures listed, regardless of the compliance approach used. More stringent energy measures listed on the Certificate of Compliance (CF-1R, CF-1R-ADD, or CF-1R-ALT Form) shall supersede the items marked with an asterisk (*) below. This Mandatory Measures Summary shall be incorporated into the permit documents, and the applicable features shall be considered by all parties as minimum component performance specifications whether they are shown elsewhere in the documents or in this summary. Submit all applicable sections of the MF-1R Form with plans.

Building Envelope Measures:

- §116(a)1: Doors and windows between conditioned and unconditioned spaces are manufactured to limit air leakage.
- §116(a)4: Fenestration products (except field-fabricated windows) have a label listing the certified U-Factor, certified Solar Heat Gain Coefficient (SHGC), and infiltration that meets the requirements of §10-111(a).
- §117: Exterior doors and windows are weather-stripped; all joints and penetrations are caulked and sealed.
- §118(a): Insulation specified or installed meets Standards for Insulating Material. Indicate type and include on CF-6R Form.
- §118(i): The thermal emittance and solar reflectance values of the cool roofing material meets the requirements of §118(i) when the installation of a Cool Roof is specified on the CF-1R Form.
- *§150(a): Minimum R-19 insulation in wood-frame ceiling or equivalent U-factor.
- §150(b): Loose fill insulation shall conform with manufacturer's installed design labeled R-Value.
- *§150(c): Minimum R-13 insulation in wood-frame wall or equivalent U-factor.
- *§150(d): Minimum R-13 insulation in raised wood-frame floor or equivalent U-factor.
- §150(f): Air retarding wrap is tested, labeled, and installed according to ASTM E1677-95(2000) when specified on the CF-1R Form.
- §150(g): Mandatory Vapor barrier installed in Climate Zones 14 or 16.
- §150(I): Water absorption rate for slab edge insulation material alone without facings is no greater than 0.3%; water vapor permeance rate is no greater than 2.0 perm/inch and shall be protected from physical damage and UV light deterioration.

Fireplaces, Decorative Gas Appliances and Gas Log Measures:

- §150(e)1A: Masonry or factory-built fireplaces have a closable metal or glass door covering the entire opening of the firebox.
- §150(e)1B: Masonry or factory-built fireplaces have a combustion outside air intake, which is at least six square inches in area and is equipped with a with a readily accessible, operable, and tight-fitting damper and or a combustion-air control device.
- §150(e)2: Continuous burning pilot lights and the use of indoor air for cooling a firebox jacket, when that indoor air is vented to the outside of the building, are prohibited.

Space Conditioning, Water Heating and Plumbing System Measures:

- §110-§113: HVAC equipment, water heaters, showerheads, faucets and all other regulated appliances are certified by the Energy Commission.
- §113(c)5: Water heating recirculation loops serving multiple dwelling units and High-Rise residential occupancies meet the air release valve, backflow prevention, pump isolation valve, and recirculation loop connection requirements of §113(c)5.
- §115: Continuously burning pilot lights are prohibited for natural gas: fan-type central furnaces, household cooking appliances (appliances with an electrical supply voltage connection with pilot lights that consume less than 150 Btu/hr are exempt), and pool and spa heaters.
- §150(h): Heating and/or cooling loads are calculated in accordance with ASHRAE, SMACNA or ACCA.
- §150(i): Heating systems are equipped with thermostats that meet the setback requirements of Section 112(c).
- §150(j)1A: Storage gas water heaters rated with an Energy Factor no greater than the federal minimal standard are externally wrapped with insulation having an installed thermal resistance of R-12 or greater.
- §150(j)1B: Unfired storage tanks, such as storage tanks or backup tanks for solar water-heating system, or other indirect hot water tanks have R-12 external insulation or R-16 internal insulation where the internal insulation R-value is indicated on the exterior of the tank.
- §150(j)2: First 5 feet of hot and cold water pipes closest to water heater tank, non-recirculating systems, and entire length of recirculating sections of hot water pipes are insulated per Standards Table 150-B.
- §150(j)2: Cooling system piping (suction, chilled water, or brine lines), and piping insulated between heating source and indirect hot water tank shall be insulated to Table 150-B and Equation 150-A.
- §150(j)2: Pipe insulation for steam hydronic heating systems or hot water systems >15 psi, meets the requirements of Standards Table 123-A.
- §150(j)3A: Insulation is protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind.
- §150(j)3A: Insulation for chilled water piping and refrigerant suction lines includes a vapor retardant or is enclosed entirely in conditioned space.
- §150(j)4: Solar water-heating systems and/or collectors are certified by the Solar Rating and Certification Corporation.

MANDATORY MEASURES SUMMARY: Residential	(Page 2 of 3)	MF-1R
Project Name		Date
East Manhattan SFR (1.1%) BASE CASE		10/13/2010

§150(m)1: All air-distribution system ducts and plenums installed, are sealed and insulated to meet the requirements of CMC Sections 601, 602, 603, 604, 605 and Standard 6-5; supply-air and return-air ducts and plenums are insulated to a minimum installed level of R-4.2 or enclosed entirely in conditioned space. Openings shall be sealed with mastic, tape or other duct-closure system that meets the applicable requirements of UL 181, UL 181A, or UL 181B or aerosol sealant that meets the requirements of UL 723. If mastic or tape is used to seal openings greater than 1/4 inch, the combination of mastic and either mesh or tape shall be used

§150(m)1: Building cavities, support platforms for air handlers, and plenums defined or constructed with materials other than sealed sheet metal, duct board or flexible duct shall not be used for conveying conditioned air. Building cavities and support platforms may contain ducts. Ducts installed in cavities and support platforms shall not be compressed to cause reductions in the cross-sectional area of the ducts.

§150(m)2D: Joints and seams of duct systems and their components shall not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.

§150(m)7: Exhaust fan systems have back draft or automatic dampers.

§150(m)8: Gravity ventilating systems serving conditioned space have either automatic or readily accessible, manually operated dampers.

§150(m)9: Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material.

§150(m)10: Flexible ducts cannot have porous inner cores.

§150(o): All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2-2007 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. Window operation is not a permissible method of providing the Whole Building Ventilation required in Section 4 of that Standard.

Pool and Spa Heating Systems and Equipment Measures:

§114(a): Any pool or spa heating system shall be certified to have: a thermal efficiency that complies with the Appliance Efficiency Regulations; an on-off switch mounted outside of the heater; a permanent weatherproof plate or card with operating instructions; and shall not use electric resistance heating or a pilot light.

§114(b)1: Any pool or spa heating equipment shall be installed with at least 36" of pipe between filter and heater, or dedicated suction and return lines, or built-up connections for future solar heating.

§114(b)2: Outdoor pools or spas that have a heat pump or gas heater shall have a cover.

§114(b)3: Pools shall have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.

§150(p): Residential pool systems or equipment meet the pump sizing, flow rate, piping, filters, and valve requirements of §150(p).

Residential Lighting Measures:

§150(k)1: High efficacy luminaires or LED Light Engine with Integral Heat Sink has an efficacy that is no lower than the efficacies contained in Table 150-C and is not a low efficacy luminaire as specified by §150(k)2.

§150(k)3: The wattage of permanently installed luminaires shall be determined as specified by §130(d).

§150(k)4: Ballasts for fluorescent lamps rated 13 Watts or greater shall be electronic and shall have an output frequency no less than 20 kHz.

§150(k)5: Permanently installed night lights and night lights integral to a permanently installed luminaire or exhaust fan shall contain only high efficacy lamps meeting the minimum efficacies contained in Table 150-C and shall not contain a line-voltage socket or line-voltage lamp holder; OR shall be rated to consume no more than five watts of power as determined by §130(d), and shall not contain a medium screw-base socket.

§150(k)6: Lighting integral to exhaust fans, in rooms other than kitchens, shall meet the applicable requirements of §150(k).

§150(k)7: All switching devices and controls shall meet the requirements of §150(k)7.

§150(k)8: A minimum of 50 percent of the total rated wattage of permanently installed lighting in kitchens shall be high efficacy. EXCEPTION: Up to 50 watts for dwelling units less than or equal to 2,500 ft₂ or 100 watts for dwelling units larger than 2,500 ft₂ may be exempt from the 50% high efficacy requirement when: all low efficacy luminaires in the kitchen are controlled by a manual on occupant sensor, dimmer, energy management system (EMCS), or a multi-scene programmable control system; and all permanently installed luminaries in garages, laundry rooms, closets greater than 70 square feet, and utility rooms are high efficacy and controlled by a manual-on occupant sensor.

§150(k)9: Permanently installed lighting that is internal to cabinets shall use no more than 20 watts of power per linear foot of illuminated cabinet.

MANDATORY MEASURES SUMMARY: Residential	(Page 3 of 3)	MF-1R
Project Name		Date
East Manhattan SFR (1.1%) BASE CASE		10/13/2010

§150(k)10: Permanently installed luminaires in bathrooms, attached and detached garages, laundry rooms, closets and utility rooms shall be high efficacy.

EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by a manual-on occupant sensor certified to comply with the applicable requirements of §119.

EXCEPTION 2: Permanently installed low efficacy luminaires in closets less than 70 square feet are not required to be controlled by a manual-on occupancy sensor.

§150(k)11: Permanently installed luminaires located in rooms or areas other than in kitchens, bathrooms, garages, laundry rooms, closets, and utility rooms shall be high efficacy luminaires. EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided they are controlled by either a dimmer switch that complies with the applicable requirements of §119, or by a manual-on occupant sensor that complies with the applicable requirements of §119. EXCEPTION 2: Lighting in detached storage building less than 1000 square feet located on a residential site is not required to comply with §150(k)11.

§150(k)12: Luminaires recessed into insulated ceilings shall be listed for zero clearance insulation contact (IC) by Underwriters Laboratories or other nationally recognized testing/rating laboratory; and have a label that certifies the lumiunaire is airtight with air leakage less then 2.0 CFM at 75 Pascals when tested in accordance with ASTM E283; and be sealed with a gasket or caulk between the luminaire housing and ceiling.

§150(k)13: Luminaires providing outdoor lighting, including lighting for private patios in low-rise residential buildings with four or more dwelling units, entrances, balconies, and porches, which are permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy. EXCEPTION 1: Permanently installed outdoor low efficacy luminaires shall be allowed provided that they are controlled by a manual on/off switch, a motion sensor not having an override or bypass switch that disables the motion sensor, and one of the following controls: a photocontrol not having an override or bypass switch that disables the photocontrol; OR an astronomical time clock not having an override or bypass switch that disables the astronomical time clock; OR an energy management control system (EMCS) not having an override or bypass switch that allows the luminaire to be always on EXCEPTION 2: Outdoor luminaires used to comply with Exception1 to §150(k)13 may be controlled by a temporary override switch which bypasses the motion sensing function provided that the motion sensor is automatically reactivated within six hours. EXCEPTION 3: Permanently installed luminaires in or around swimming pool, water features, or other location subject to Article 680 of the California Electric Code need not be high efficacy luminaires.

§150(k)14: Internally illuminated address signs shall comply with Section 148; OR not contain a screw-base socket, and consume no more than five watts of power as determined according to §130(d).

§150(k)15: Lighting for parking lots and carports with a total of for 8 or more vehicles per site shall comply with the applicable requirements in Sections 130, 132, 134, and 147. Lighting for parking garages for 8 or more vehicles shall comply with the applicable requirements of Sections 130, 131, 134, and 146.

§150(k)16: Permanently installed lighting in the enclosed, non-dwelling spaces of low-rise residential buildings with four or more dwelling units shall be high efficacy luminaires. EXCEPTION: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by an occupant sensor(s) certified to comply with the applicable requirements of §119.

System Name Whole House System ENGINEERING CHECKS Sumber of Systems Heating System Output per System Total Output (Btuh) Output (Btuh/sqft) Cooling System Output per System Total Output (Btuh) Total Output (Btuh) Total Output (Btuh) Airflow (cfm/sqft) Airflow (cfm/Ton) Outside Air (%)		Total Room Loads Return Vented Lighting Return Air Ducts Return Fan Ventilation Supply Fan Supply Air Ducts TOTAL SYSTEM LOAD HVAC EQUIPMENT SELECTION CARRIER 58MSA060-12	COIL CFM 1,038	0 1,125 0	EAK Latent 2,592 0 2,592	,	Area 3,137 TG. PEAK Sensible 30,191 1,468 0 0 1,468 33,126
ENGINEERING CHECKS Jumber of Systems Jeating System Output per System Total Output (Btuh) Output (Btuh/sqft) Cooling System Output per System Total Output (Btuh) Total Output (Tons) Total Output (Btuh/sqft) Total Output (sqft/Ton) Air System CFM per System Airflow (cfm/sqft) Airflow (cfm/sqft) Airflow (cfm/sqft)	55,000 17.5 0 0 0.0 0.0 0.0 1,995 1,995 0.64 0.0	Total Room Loads Return Vented Lighting Return Air Ducts Return Fan Ventilation Supply Fan Supply Air Ducts TOTAL SYSTEM LOAD HVAC EQUIPMENT SELECTION CARRIER 58MSA060-12	CFM 1,038	Sensible 25,080 0 1,125 0 0 1,125 27,329	2,592 0	COIL H	TG. PEAK Sensible 30,19 1,468 (((((((((((((((((((
Aumber of Systems Reating System Output per System Total Output (Btuh) Output (Btuh/sqft) Cooling System Output per System Total Output (Btuh) Total Output (Tons) Total Output (Btuh/sqft) Total Output (sqft/Ton) Air System CFM per System Airflow (cfm/sqft) Airflow (cfm/sqft) Airflow (cfm/sqft)	55,000 17.5 0 0 0.0 0.0 0.0 1,995 1,995 0.64 0.0	Total Room Loads Return Vented Lighting Return Air Ducts Return Fan Ventilation Supply Fan Supply Air Ducts TOTAL SYSTEM LOAD HVAC EQUIPMENT SELECTION CARRIER 58MSA060-12	CFM 1,038	Sensible 25,080 0 1,125 0 0 1,125 27,329	2,592 0	CFM 818	30,19 ² 1,468 (0) (1) 1,468 33,126
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Output per System Total Output (Btuh) Total Output (Tons) Total Output (Btuh/sqft) Total Output (sqft/Ton) Air System CFM per System Airflow (cfm) Airflow (cfm/sqft) Airflow (cfm/sqft)	0 0 0.0 0.0 0.0 1,995 1,995 0.64 0.0	Return Fan Ventilation Supply Fan Supply Air Ducts TOTAL SYSTEM LOAD HVAC EQUIPMENT SELECTION CARRIER 58MSA060-12	0	0 0 0 1,125 27,329	2,592	0	1,468
Output per System Total Output (Btuh) Total Output (Tons) Total Output (Btuh/sqft) Total Output (sqft/Ton) Air System CFM per System Airflow (cfm) Airflow (cfm/sqft) Airflow (cfm/Ton)	0 0.0 0.0 0.0 1,995 1,995 0.64 0.0	Ventilation Supply Fan Supply Air Ducts TOTAL SYSTEM LOAD HVAC EQUIPMENT SELECTION CARRIER 58MSA060-12	0	0 0 1,125 27,329	2,592	0	1,468 33,126
Total Output (Btuh) Total Output (Tons) Total Output (Btuh/sqft) Total Output (sqft/Ton) Air System CFM per System Airflow (cfm) Airflow (cfm/sqft) Airflow (cfm/Ton)	0 0.0 0.0 0.0 1,995 1,995 0.64 0.0	Supply Fan Supply Air Ducts TOTAL SYSTEM LOAD HVAC EQUIPMENT SELECTION CARRIER 58MSA060-12	0	0 1,125 27,329	2,592	0	1,468 33,126
Total Output (Tons) Total Output (Btuh/sqft) Total Output (sqft/Ton) Air System CFM per System Airflow (cfm) Airflow (cfm/sqft) Airflow (cfm/Ton)	0.0 0.0 0.0 1,995 1,995 0.64 0.0	Supply Air Ducts TOTAL SYSTEM LOAD HVAC EQUIPMENT SELECTION CARRIER 58MSA060-12		1,125 27,329	, ,		1,468 33,126
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Total Output (sqft/Ton) Air System CFM per System Airflow (cfm) Airflow (cfm/sqft) Airflow (cfm/Ton)	0.0 1,995 1,995 0.64 0.0	HVAC EQUIPMENT SELECTION CARRIER 58MSA060-12			, ,		
Air System CFM per System Airflow (cfm) Airflow (cfm/sqft) Airflow (cfm/Ton)	1,995 1,995 0.64 0.0	HVAC EQUIPMENT SELECTION CARRIER 58MSA060-12			, ,		
Air System CFM per System Airflow (cfm) Airflow (cfm/sqft) Airflow (cfm/Ton)	1,995 0.64 0.0	HVAC EQUIPMENT SELECTION CARRIER 58MSA060-12		0	0		55,000
CFM per System Airflow (cfm) Airflow (cfm/sqft) Airflow (cfm/Ton)	1,995 0.64 0.0	CARRIER 58MSA060-12		0	0	_	55,000
Airflow (cfm) Airflow (cfm/sqft) Airflow (cfm/Ton)	1,995 0.64 0.0	CARRIER 58MSA060-12		0	0		55,000
Airflow (cfm/sqft) Airflow (cfm/Ton)	0.64						
Airflow (cfm/Ton)	0.0						
Outside Air (%)		Total Adjusted System Output		0	0		55,000
	0.00	Total Adjusted System Output (Adjusted for Peak Design conditions)		0	0	_	33,000
Outside Air (cfm/sqft)		TIME OF CVOTEM DEAK			Aug 2 DM		Jan 1 AN
Iote: values above given at ARI		TIME OF SYSTEM PEAK Airstream Temperatures at Time	of Heating	Peak)	Aug 3 PM		Jan I An
Outside Air 0 cfm	69 °F Heating C	Coil Supply Fan 1,995 cfm	105 °F →		RC	ООМ	04 °F
COOLING SYSTEM PSYCHRO 4 / 69 °F Outside Air 0 cfm		Cooling Coil Supply Fan 1,995 cfm	f Cooling F	Peak)	6 RC	ООМ	/ 54 °F / 63 °F

BUILDING ENERGY ANALYSIS REPORT

PROJECT:

East Manhattan SFR (15%) All ECM's 1647 Mathews Avenue Manhattan Beach, CA 90266

Project Designer:

2100 N. Sepulveda Blvd., #11 Manhattan Beach, CA 90266 (310) 379-5867

Report Prepared by:

Rick Newton NEWTON ENERGY 1401 19th Street Manhattan Beach, CA 90266 310 375-2699



Job Number:

8152R

Date:

10/16/2010

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2008 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

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Cover Page	1
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Form CF-1R Certificate of Compliance	3
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HVAC System Heating and Cooling Loads Summary	12

EnergyPro 5.1 by EnergySoft Job Number: ID: 8152R User Number: 2100

PER	FORMA	NCE CE	RTIFICA	TE: F	Resid	ential			(Part 1	of 5)	CF-1R
Project N		SED (15%) All ECM's	Build	ding Type		gle Famil ti Family		ddition Alone xisting+ Addition	n/Alteration	Date 10/16/201
	ddress	51 IX (1370 ₎	All LCIVIS	Cali	fornia Ene	ergy Clima	•		Cond. Floor Area	Addition	# of Stories
647 N	1athews A	renue M	anhattan Bea	ach C	A Clim	ate Zon	e 06		3,137	n/a	2
IEL	D INSPE	ECTION	ENERGY	CHE	CKLI	ST					
] Yes	s □ No	HERS M	easures l	If Yes,	A CF-	4R mus	st be p	rovid	ed per Part 2	2 of 5 of tl	nis form.
1 Yes	s □ No	Special I	eatures	If Yes,	see Pa	art 2 of	5 of th	nis for	m for details	S.	
NSU	LATION					Area	Spe	ecial			
cons	truction	Type		Cav	ity	(ft ²)	Fea	tures	s (see Part 2	2 of 5)	Status
oor	Wood Fram	ned w/o Crawi	Space	R-19		404					New
oof	Wood Fram	ned Rafter		R-30		1,880					New
all	Wood Fram	ned		R-13		2,701					New
ab		Slab-on-Grade)	None		1,512	Perim =	= 160'			New
oor	Opaque Do	or		None		21					New
	STRATIO	0	U-						Exterior		
	tation A	Area(ft ²)		HGC	Over	hang	Sidefi	ins	Shades		Status
ylight		36.0	0.390	0.29	none		none		None		New
ear (N)		181.5	0.330	0.31	none		none		Bug Screen		New
ont (S)		189.4	0.330	0.31	none		none		Bug Screen		New
ght (E) ft (W)		46.7 68.0	0.330	0.31	none		none		Bug Screen Bug Screen		New New
ont (S)		84.0	0.330	0.31	6.0		none		Bug Screen		New
ght (E)		17.5	0.330	0.31	11.0		none		Bug Screen		New
ght (E)		16.0	0.330	0.31	3.5		none		Bug Screen		New
eft (W)		20.0	0.330	0.31	3.0		none		Bug Screen		New
IVAC	SYSTEN	//S									_
Qty.	Heating		Min. Eff	Co	oling		Min	. Eff	Thei	mostat	Status
1	Central Furna	ace	92% AFUE	No	Cooling		13.0	SEER	Setback		New
IVAC	DISTRIE	BUTION								Ouct	
ocal			ating	Co	oling	Duc	t Loca	ation		R-Value	Status
hole Ho	ouse System	Ducte	d	Duct	ed	Attic, C	eiling Ins	, vented	1 4	1.2	New
VATE	R HEATI	NG									
ty.	Type		Gal	lons	Min.	Eff	Distril	<u>butio</u>	n		Status
1	Small Gas		75		0.58		Kitchen I	Pipe Ins	;		New
neravE	Pro 5.1 by Ener	gySoft Us	er Number: 2100	Ru	nCode: 2	2010-10-16	T18:47:4	17	ID: 8152R		Page 3 of 1

PERFORMANCE CERTIFICATE:	Resider	ntial	(Part 2 of 5)	CF-1R
Project Name East Manhattan SFR (15%) All ECM's	Building Type	☑ Single Family ☐ Multi Family	☐ Addition Alone ☐ Existing+ Addition/Alteration	Date 10/16/2010
SPECIAL FEATURES INSPECTION The enforcement agency should pay special attention justification and documentation, and special verification.	n to the items s on to be used v	pecified in this che vith the performan	ice approach. The enforcement a	gency
determines the adequacy of the justification, and may the special justification and documentation submitted				adequacy of
The HVAC System Carrier Corp. N9MPD060F12 does not in	nclude a cooling s	system, field verifica	tion is not necessary.	
LIEDO DE OLUBED VEDICIOATIO				
HERS REQUIRED VERIFICATIO Items in this section require field testing and/or completed CF-4R form for each of the measure.	verification by			eceive a
Compliance credit for quality installation of insulation has be				
Whole House System includes verified duct systems that ha for ducts in conditioned space and duct leakage is required.	ve air leakage to	outside conditions e	equal to or less than 25 cfm. HERS fi	eld verification
EnergyPro 5.1 by EnergySoft	RunCode: 2010)-10-16T18:47:47	ID: 8152R	Page 4 of 12

PERFORM	MANCE (CERTI	FICATE	: Resider	ntial	(Pa	rt 3 of 5)	CF-1R
Project Name				Building Type				Date
East Manhatta	an SFR (15	5%) All E	ECM's		☐ Multi Family	☐ Existing+	Addition/Alteration	10/16/2010
ANNUAL ENE	RGY USE S	UMMAF	RY					
TDV (kBtu/i		ndard	Proposed	Margin				
Space Heating	• /	8.10	5.62	2.48				
Space Cooling		1.20	0.32	0.88				
Fans		1.94	1.57	0.37				
Domestic Hot V	Nater	12.31	12.21	0.11				
Pumps		0.00	0.00	0.00				
T	otals	23.56	19.72	3.84				
Percent Better	r Than Stan	dard:		16.3 %				
Bl	UILDIN	G CO	MPLIE	S - HERS	S VERIFIC	ATION	REQUIRE)
5 " "	.		(0)	100 des	5 · W !! /5			enestration
Building Front ((S)	180 deg	Ext. Walls/R	oot Wa	ıll Area	Area
Number of Dwe	_		A	1.00	(S)		594	273
Fuel Available			Nat	fural Gas	(W)		1,025	88
Raised Floor A				404 1,512	(N)		853 873	182 80
Slab on Grade					(E)			
Average Ceiling				9.3	Roof		1,916	36
Fenestration	Average U			0.33	_		TOTAL:	659
REMARKS	Average S	HGC:		0.31	F	enestration/C	FA Ratio:	21.0 %
15% CASE - All EC ECM-6 - Quality Ins ECM-11 - Low Leak	sulation - HERS		•					
ECM-6 - Quality Ins ECM-11 - Low Leak STATEMEN This certificate to comply with	sulation - HERS kage Ducts in C	MPLIAI ce lists t	d Space: 12.49 NCE the building Administrat	features and sive Regulations	pecifications nee s and Part 6 the	ded		
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MANDATORY MEASURES SUMMARY: Residential

(Page 1 of 3)

MF-1R

Project Name

East Manhattan SFR (15%) All ECM's

10/16/2010

NOTE: Low-rise residential buildings subject to the Standards must comply with all applicable mandatory measures listed, regardless of the compliance approach used. More stringent energy measures listed on the Certificate of Compliance (CF-1R, CF-1R-ADD, or CF-1R-ALT Form) shall supersede the items marked with an asterisk (*) below. This Mandatory Measures Summary shall be incorporated into the permit documents, and the applicable features shall be considered by all parties as minimum component performance specifications whether they are shown elsewhere in the documents or in this summary. Submit all applicable sections of the MF-1R Form with plans.

Building Envelope Measures:

- §116(a)1: Doors and windows between conditioned and unconditioned spaces are manufactured to limit air leakage.
- §116(a)4: Fenestration products (except field-fabricated windows) have a label listing the certified U-Factor, certified Solar Heat Gain Coefficient (SHGC), and infiltration that meets the requirements of §10-111(a).
- §117: Exterior doors and windows are weather-stripped; all joints and penetrations are caulked and sealed.
- §118(a): Insulation specified or installed meets Standards for Insulating Material. Indicate type and include on CF-6R Form.
- §118(i): The thermal emittance and solar reflectance values of the cool roofing material meets the requirements of §118(i) when the installation of a Cool Roof is specified on the CF-1R Form.
- *§150(a): Minimum R-19 insulation in wood-frame ceiling or equivalent U-factor.
- §150(b): Loose fill insulation shall conform with manufacturer's installed design labeled R-Value.
- *§150(c): Minimum R-13 insulation in wood-frame wall or equivalent U-factor.
- *§150(d): Minimum R-13 insulation in raised wood-frame floor or equivalent U-factor.
- §150(f): Air retarding wrap is tested, labeled, and installed according to ASTM E1677-95(2000) when specified on the CF-1R Form.
- §150(g): Mandatory Vapor barrier installed in Climate Zones 14 or 16.
- §150(I): Water absorption rate for slab edge insulation material alone without facings is no greater than 0.3%; water vapor permeance rate is no greater than 2.0 perm/inch and shall be protected from physical damage and UV light deterioration.

Fireplaces, Decorative Gas Appliances and Gas Log Measures:

- §150(e)1A: Masonry or factory-built fireplaces have a closable metal or glass door covering the entire opening of the firebox.
- §150(e)1B: Masonry or factory-built fireplaces have a combustion outside air intake, which is at least six square inches in area and is equipped with a with a readily accessible, operable, and tight-fitting damper and or a combustion-air control device.
- §150(e)2: Continuous burning pilot lights and the use of indoor air for cooling a firebox jacket, when that indoor air is vented to the outside of the building, are prohibited.

Space Conditioning, Water Heating and Plumbing System Measures:

- §110-§113: HVAC equipment, water heaters, showerheads, faucets and all other regulated appliances are certified by the Energy Commission.
- §113(c)5: Water heating recirculation loops serving multiple dwelling units and High-Rise residential occupancies meet the air release valve, backflow prevention, pump isolation valve, and recirculation loop connection requirements of §113(c)5.
- §115: Continuously burning pilot lights are prohibited for natural gas: fan-type central furnaces, household cooking appliances (appliances with an electrical supply voltage connection with pilot lights that consume less than 150 Btu/hr are exempt), and pool and spa heaters.
- §150(h): Heating and/or cooling loads are calculated in accordance with ASHRAE, SMACNA or ACCA.
- §150(i): Heating systems are equipped with thermostats that meet the setback requirements of Section 112(c).
- §150(j)1A: Storage gas water heaters rated with an Energy Factor no greater than the federal minimal standard are externally wrapped with insulation having an installed thermal resistance of R-12 or greater.
- §150(j)1B: Unfired storage tanks, such as storage tanks or backup tanks for solar water-heating system, or other indirect hot water tanks have R-12 external insulation or R-16 internal insulation where the internal insulation R-value is indicated on the exterior of the tank.
- §150(j)2: First 5 feet of hot and cold water pipes closest to water heater tank, non-recirculating systems, and entire length of recirculating sections of hot water pipes are insulated per Standards Table 150-B.
- §150(j)2: Cooling system piping (suction, chilled water, or brine lines), and piping insulated between heating source and indirect hot water tank shall be insulated to Table 150-B and Equation 150-A.
- §150(j)2: Pipe insulation for steam hydronic heating systems or hot water systems >15 psi, meets the requirements of Standards Table 123-A.
- §150(j)3A: Insulation is protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind.
- §150(j)3A: Insulation for chilled water piping and refrigerant suction lines includes a vapor retardant or is enclosed entirely in conditioned space.
- §150(j)4: Solar water-heating systems and/or collectors are certified by the Solar Rating and Certification Corporation.

MANDATORY MEASURES SUMMARY: Residential	(Page 2 of 3)	MF-1R
Project Name		Date
East Manhattan SFR (15%) All ECM's		10/16/2010

§150(m)1: All air-distribution system ducts and plenums installed, are sealed and insulated to meet the requirements of CMC Sections 601, 602, 603, 604, 605 and Standard 6-5; supply-air and return-air ducts and plenums are insulated to a minimum installed level of R-4.2 or enclosed entirely in conditioned space. Openings shall be sealed with mastic, tape or other duct-closure system that meets the applicable requirements of UL 181, UL 181A, or UL 181B or aerosol sealant that meets the requirements of UL 723. If mastic or tape is used to seal openings greater than 1/4 inch, the combination of mastic and either mesh or tape shall be used

§150(m)1: Building cavities, support platforms for air handlers, and plenums defined or constructed with materials other than sealed sheet metal, duct board or flexible duct shall not be used for conveying conditioned air. Building cavities and support platforms may contain ducts. Ducts installed in cavities and support platforms shall not be compressed to cause reductions in the cross-sectional area of the ducts.

§150(m)2D: Joints and seams of duct systems and their components shall not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.

§150(m)7: Exhaust fan systems have back draft or automatic dampers.

§150(m)8: Gravity ventilating systems serving conditioned space have either automatic or readily accessible, manually operated dampers.

§150(m)9: Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material.

§150(m)10: Flexible ducts cannot have porous inner cores.

§150(o): All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2-2007 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. Window operation is not a permissible method of providing the Whole Building Ventilation required in Section 4 of that Standard.

Pool and Spa Heating Systems and Equipment Measures:

§114(a): Any pool or spa heating system shall be certified to have: a thermal efficiency that complies with the Appliance Efficiency Regulations; an on-off switch mounted outside of the heater; a permanent weatherproof plate or card with operating instructions; and shall not use electric resistance heating or a pilot light.

§114(b)1: Any pool or spa heating equipment shall be installed with at least 36" of pipe between filter and heater, or dedicated suction and return lines, or built-up connections for future solar heating.

§114(b)2: Outdoor pools or spas that have a heat pump or gas heater shall have a cover.

§114(b)3: Pools shall have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.

§150(p): Residential pool systems or equipment meet the pump sizing, flow rate, piping, filters, and valve requirements of §150(p).

Residential Lighting Measures:

§150(k)1: High efficacy luminaires or LED Light Engine with Integral Heat Sink has an efficacy that is no lower than the efficacies contained in Table 150-C and is not a low efficacy luminaire as specified by §150(k)2.

§150(k)3: The wattage of permanently installed luminaires shall be determined as specified by §130(d).

§150(k)4: Ballasts for fluorescent lamps rated 13 Watts or greater shall be electronic and shall have an output frequency no less than 20 kHz.

§150(k)5: Permanently installed night lights and night lights integral to a permanently installed luminaire or exhaust fan shall contain only high efficacy lamps meeting the minimum efficacies contained in Table 150-C and shall not contain a line-voltage socket or line-voltage lamp holder; OR shall be rated to consume no more than five watts of power as determined by §130(d), and shall not contain a medium screw-base socket.

§150(k)6: Lighting integral to exhaust fans, in rooms other than kitchens, shall meet the applicable requirements of §150(k).

§150(k)7: All switching devices and controls shall meet the requirements of §150(k)7.

§150(k)8: A minimum of 50 percent of the total rated wattage of permanently installed lighting in kitchens shall be high efficacy. EXCEPTION: Up to 50 watts for dwelling units less than or equal to 2,500 ft₂ or 100 watts for dwelling units larger than 2,500 ft₂ may be exempt from the 50% high efficacy requirement when: all low efficacy luminaires in the kitchen are controlled by a manual on occupant sensor, dimmer, energy management system (EMCS), or a multi-scene programmable control system; and all permanently installed luminaries in garages, laundry rooms, closets greater than 70 square feet, and utility rooms are high efficacy and controlled by a manual-on occupant sensor.

§150(k)9: Permanently installed lighting that is internal to cabinets shall use no more than 20 watts of power per linear foot of illuminated cabinet.

MANDATORY MEASURES SUMMARY: Residential	(Page 3 of 3)	MF-1R
Project Name		Date
East Manhattan SFR (15%) All ECM's		10/16/2010

§150(k)10: Permanently installed luminaires in bathrooms, attached and detached garages, laundry rooms, closets and utility rooms shall be high efficacy.

EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by a manual-on occupant sensor certified to comply with the applicable requirements of §119.

EXCEPTION 2: Permanently installed low efficacy luminaires in closets less than 70 square feet are not required to be controlled by a manual-on occupancy sensor.

§150(k)11: Permanently installed luminaires located in rooms or areas other than in kitchens, bathrooms, garages, laundry rooms, closets, and utility rooms shall be high efficacy luminaires. EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided they are controlled by either a dimmer switch that complies with the applicable requirements of §119, or by a manual-on occupant sensor that complies with the applicable requirements of §119. EXCEPTION 2: Lighting in detached storage building less than 1000 square feet located on a residential site is not required to comply with §150(k)11.

§150(k)12: Luminaires recessed into insulated ceilings shall be listed for zero clearance insulation contact (IC) by Underwriters Laboratories or other nationally recognized testing/rating laboratory; and have a label that certifies the luminaire is airtight with air leakage less then 2.0 CFM at 75 Pascals when tested in accordance with ASTM E283; and be sealed with a gasket or caulk between the luminaire housing and ceiling.

§150(k)13: Luminaires providing outdoor lighting, including lighting for private patios in low-rise residential buildings with four or more dwelling units, entrances, balconies, and porches, which are permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy. EXCEPTION 1: Permanently installed outdoor low efficacy luminaires shall be allowed provided that they are controlled by a manual on/off switch, a motion sensor not having an override or bypass switch that disables the motion sensor, and one of the following controls: a photocontrol not having an override or bypass switch that disables the photocontrol; OR an astronomical time clock not having an override or bypass switch that disables the astronomical time clock; OR an energy management control system (EMCS) not having an override or bypass switch that allows the luminaire to be always on EXCEPTION 2: Outdoor luminaires used to comply with Exception1 to §150(k)13 may be controlled by a temporary override switch which bypasses the motion sensing function provided that the motion sensor is automatically reactivated within six hours. EXCEPTION 3: Permanently installed luminaires in or around swimming pool, water features, or other location subject to Article 680 of the California Electric Code need not be high efficacy luminaires.

§150(k)14: Internally illuminated address signs shall comply with Section 148; OR not contain a screw-base socket, and consume no more than five watts of power as determined according to §130(d).

§150(k)15: Lighting for parking lots and carports with a total of for 8 or more vehicles per site shall comply with the applicable requirements in Sections 130, 132, 134, and 147. Lighting for parking garages for 8 or more vehicles shall comply with the applicable requirements of Sections 130, 131, 134, and 146.

§150(k)16: Permanently installed lighting in the enclosed, non-dwelling spaces of low-rise residential buildings with four or more dwelling units shall be high efficacy luminaires. EXCEPTION: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by an occupant sensor(s) certified to comply with the applicable requirements of §119.

Project Name East Manhattan SFR (15		AND COOLING LOAD	<u> </u>			Date 10/	16/2010
System Name	•					Floor	
Whole House System						,	3,137
ENGINEERING CHECKS		SYSTEM LOAD					
Number of Systems	1			COOLING P			TG. PEAK
Heating System			CFM	Sensible	Latent	CFM	Sensible
Output per System	55,000	Total Room Loads	1,013		2,477	780	29,353
Total Output (Btuh)	55,000	Return Vented Lighting		0			
Output (Btuh/sqft)	17.5	Return Air Ducts		0			0
Cooling System		Return Fan		0			0
Output per System	0	Ventilation	0	0	0	0	0
Total Output (Btuh)	0	Supply Fan		0			0
Total Output (Tons)	0.0	Supply Air Ducts		0			0
Total Output (Btuh/sqft)	0.0						
Total Output (sqft/Ton)	0.0	TOTAL SYSTEM LOAD		25,056	2,477		29,353
Air System							
CFM per System	1,995	HVAC EQUIPMENT SELECTION					
Airflow (cfm)	1,995	Carrier Corp. N9MPD060F12		0	0		55,000
Airflow (cfm/sqft)	0.64						
Airflow (cfm/Ton)	0.0						
Outside Air (%)	0.0 %	Total Adjusted System Output		0	0		55,000
Outside Air (cfm/sqft)	0.00	(Adjusted for Peak Design conditions)		<u>L</u>			
Note: values above given at AR	l conditions	TIME OF SYSTEM PEAK			Aug 3 PM		Jan 1 AM
		(Airstream Temperatures at Time	of Heating	Peak)		·	
Outside Air 0 cfm	70 °F Heating 0	105 °F Coil Supply Fan 1,995 cfm	105 °F →		RC	DOM	05 °F
70 °F	ROMETICS (/	Airstream Temperatures at Time o	f Cooling F	Doak)		7	70 °F
OOOLING STOTEM TOTOTI	IOMETIOS (A	-		can			
84 / 69 °F	78	3/62 °F 55/54 °F 55/	54 °F				
					₹		_
Outside Air			´				↓
0 cfm		Cooling Coil Supply Fan 1,995 cfm		41.9 %	6 RC	ООМ	/ 54 °F / 63 °F
78 / 63 °F	—					10	
EnergyPro 5.1 by EnergySoft	User Number:	2100 RunCode: 2010-10-16T18	:47:47	ID: 8152R		F	Page 12 of 12

LIFE CYCLE COSTING SUMMARY

Project Name

LCC for East Manhattan SFR to 15% - 2 year

LCC-1

10/19/2010

ANNUAL ENERGY USE AND COST

			Electricity		Natural	Gas	
Option	Description	Consumption (kWh)	Demand (kW)	Cost (\$)	Consumption (therms)	Cost (\$)	Simple Payback (years)
Base	East Manhattan SFR BASE CASE	521	4	\$691	419	\$138	N/A
1	ECM-6 - Quality Insulation - HERS: 6.6%	481	4	\$666	408	\$134	5.1
2	ECM-11 - Low Leak. Ducts in Cond. Space: 12.4%	455	3	\$265	397	\$131	0.8
3	TOTAL: East Manhattan SFR (20%) All ECM's	481	4	\$266	340	\$112	1.4

LIFE CYCLE COST PRESENT VALUE

Option	Initial Cost	Utility Incentive	Annual Recurring Costs	Electricity Costs	Natural Gas Costs	Non Annual Recurring OM&R Cost	Replacem. Costs	Residual Value	Total LCC	Savings
Base	\$0	\$0	\$0	\$1,323	\$292	\$0	\$0	\$0	\$1,615	\$0
1	\$150	\$0	\$0	\$1,273	\$284	\$0	\$0	\$0	\$1,708	(\$93)
2	\$350	\$0	\$0	\$507	\$277	\$0	\$0	\$0	\$1,134	\$481
3	\$625	\$0	\$0	\$509	\$237	\$0	\$0	\$0	\$1,372	\$243

Study Parameters

Study Period: 2 years

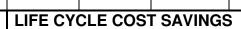
Real Discount Rate: 3.0 %

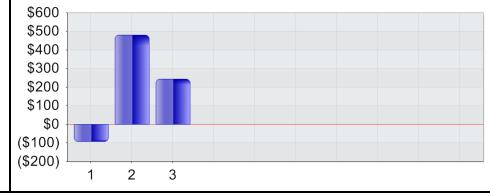
☑ DOE/FEMP Escalation Rates

Region: Western US
Fuel Sector: Commercial

☐ Uniform Escalation Rates

Electricity: N/A
Natural Gas: N/A





EnergyLCC 5.1 by EnergySoft

1 of 1

BUILDING ENERGY ANALYSIS REPORT

PROJECT:

East Manhattan E+A SFR (4.3%) BASE CASE 1516 Ruhland Avenue Manhattan Beach, CA 90266

Project Designer:

2100 N. Sepulveda Blvd. #11 Manhattan Beach, CA 90266 (310) 379-8567

Report Prepared by:

Rick Newton NEWTON ENERGY 1401 19th Street Manhattan Beach, CA 90266 310 375-2699



Job Number:

8360P

Date:

10/13/2010

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2008 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

EnergyPro 5.1 by EnergySoft User Number: 2100 RunCode: 2010-10-11T19:36:00 ID: 8360P

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Table of Contents	2
Form CF-1R Certificate of Compliance	3
Form MF-1R Mandatory Measures Summary	10
HVAC System Heating and Cooling Loads Summary	13

EnergyPro 5.1 by EnergySoft Job Number: ID: 8360P User Number: 2100

		ATE: R	esiden	tial		(Part 1	of 5)	CF-1
ie		Buildi	ng Type	☑ Single F		Addition Alone		Date
hattan E+A SF	FR (4.3%) BAS			□ Multi Fa	•	Existing+ Addition		10/13/20
ress nland Avenue	Manhattan Be					2,742	Addition 310	# of Stor
INSPECTION	ON ENERG	Y CHE	CKLIS1	<u></u>				
☑ No HERS	Measures	If Yes, A	CF-4R	must be	e provi	ded per Part 2	of 5 of th	nis form.
		•			•	•		
•	ar r datarde	11 100, 0					-	
		Cavi		0	-		of 5)	Status
Wood Framed Rafte	r	R-19		306				New
Wood Framed		R-13		607				New
Wood Framed Attic		R-11		1,654				Existing
Wood Framed		None		2,146				Existing
Wood Framed w/Cra	awl Space	None		1,975				Existing
Opaque Door		None		18				New
TD ATION						Evterie:		
_	_	SHCC	Overbo	aa Sia	lofine			Status
· · · · · · · · · · · · · · · · · · ·								
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n n	Heating	Coc	mig			i n	-Value	Status
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Project Name East Manhattan Project Address 1516 Ruhland A FIELD INSP Yes No Yes No NSULATION Construction	venue Ma ECTION HERS M	enhattan Be ENERG leasures -	each Cal Y CHE	A Clima CKLI	□ Mu ergy Clima ate Zon	Iti Family 🗹 Ite Zone Tota	Addition Alone Existing+ Addition Cond. Floor Area 2,742	on/Alteration Addition 310	Date 10/13/201 # of Storie 2	
Project Address 1516 Ruhland A FIELD INSP Yes Ø No Yes No	venue Ma ECTION HERS M Special I	enhattan Be ENERG leasures -	each Cal Y CHE If Yes,	A Clima CKLI	ergy Clima ate Zon	ite Zone Tota	l Cond. Floor Area	Addition	# of Storie	
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☑ Yes ☐ No NSULATION	Special I		-	A CF-						
NSULATION		Features -	. If Vac		4R mus	st be provi	ded per Part	2 of 5 of tl	nis form.	
NSULATION			11 1 53,	see Pa	art 2 of	5 of this fo	orm for detail	S.		
	Туре				Area	Specia				
			Cav	vity	(ft^2)	•	es (see Part	2 of 5)	Status	
FENESTRATIO	ON Area(<i>ft</i> ²)	U- Factor	SHGC	Over	hang	Sidefins	Exterior Shades		Status	
eft (SE)	7.6	0.550	0.67	none	······· <u>9</u>	none	Bug Screen		Existing	
ront (NE)	7.6	0.550	0.67	none		none	Bug Screen		Existing	
Right (NW)	27.6	0.550	0.67	none		none	Bug Screen		Existing	
Front (N)	24.0	0.550	0.67	none		none	Bug Screen		Existing	
Rear (S)	164.5	0.550	0.67	none		none	Bug Screen		Existing	
HVAC SYSTE	MS									
Qty. Heating	<u> </u>	Min. E	ff Co	ooling		Min. Ef	f The	rmostat	Status	
HVAC DISTRI	BUTION							Duct		
Location	He	eating	Co	oling	Duc	t Locatio	n i	R-Value	Status	
WATER HEAT Qty. Type	TING	G	allons	Min.	Fff	Distributi	on		Status	

PERFORMANCE CERTIFICATE:	(Part 2 of 5)	CF-1R		
Project Name East Manhattan E+A SFR (4.3%) BASE CA	Building Type	☑ Single Family ☐ Multi Family	☐ Addition Alone ☐ Existing+ Addition/Alteration	Date 10/13/2010
SPECIAL FEATURES INSPECTION	ON CHEC	CKLIST		
The enforcement agency should pay special attention justification and documentation, and special verification determines the adequacy of the justification, and may	on to be used	with the performan	ce approach. The enforcement ag	gency
the special justification and documentation submitted	•		·	dequacy of
The HVAC System Existing 80% Furnace Assumed does not	t include a coolir	ng system, field verifi	cation is not necessary.	
HERS REQUIRED VERIFICATION Items in this section require field testing and/or vector completed CF-4R form for each of the measures	erification by			eceive a
EnergyPro 5.1 by EnergySoft User Number: 2100	RunCode: 201	0-10-11T19:36:00	ID: 8360P	Page 5 of 13

Project Name E ast Manhatta			IOAIL.	: Residen	liai		(Part 3 of 5)	CF-1R
-asi iviai ii latta	n F+4 SF	R (4 3%)	BASE CA	Building Type	☑ Single Family ☐ Multi Family		ion Alone ing+ Addition/Alteration	Date 10/13/201
NNUAL ENEF				19				10/13/20
			Proposed	Margin				
TDV (kBtu/f	t^2 -vr)							
Space Heating	• •	34.96	32.83	2.13				
Space Cooling		16.34	15.62	0.72				
ans		8.90	8.50	0.40				
ans Iomestic Hot W	lator	15.31	15.31	0.00				
	valei	0.00	0.00	0.00				
umps •••	-tala							
	otals	75.50	72.25	3.25				
ercent Better				4.3 %				
BUII	LDING	COME	PLIES	- NO HEI	RS VERIFI	CAT	ION REQUIR	ED
			/A.I) O -d				enestration
uilding Front C			• ,) 0 deg	Ext. Walls/R	001	Wall Area	Area
umber of Dwe				1.00	(N)		683	65
uel Available a				ıral Gas	(E)		855	57
aised Floor Ar	ea:		1	,975	(S)		807	281
lab on Grade <i>i</i>	Area:			0	(W)		946	119
verage Ceiling	Height:			8.1	Roof		1,975	15
enestration	Average L	J-Factor:	(0.55			TOTAL:	536
	Average S	SHGC:	(0.67	Fe	enestrati	on/CFA Ratio:	19.6 %
EMARKS							or Less water heater.	
STATEMENT		MDI IAN	CE					
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CEI	RTIFIC	ATE (OF C	OMPL	.IAN	CE: I	Resid	enti	al			(Par	t 4 of	5)	С	F-1R	
,	t Name						lding Typ			Family				A.I	Date		
	Manhatt				BASE	CAS			Multi F	amily	L Exi	sting+ A	adition/	Alteration	on 10/1	13/2010	
	QUE SUI		DETAIL														
Surfa		_ U-	0		nsulatio		1-	١.	-	<u> </u>		oint App	endix	١.			
Typ <i>Roof</i>	e Area			Exterior	Frame	Interior	Frame	Azm 225	Tilt 24	Status New	4.2.2	4		_	ation/Cor on 2nd Flo		
Wall		0.002				+		180			4.3.1			_	on 2nd Flo		
Wall		2 0.102						45			4.3.1			_	on 2nd Flo		
Wall		2 0.102						315			4.3.1			Additio			
Wall	15							270			4.3.1			_	Addition 2nd Floor Addition 2nd Floor		
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Roof	45	_						30							ng Second		
Wall	14	_	None					0							ng Second		
Wall			None					270							ng Second		
Wall Wall	18		None None		-			180							ng Second ng Second		
Wall	20		None					90		·					ng Second		
Wall	11		None					270							ng Second		
Floor	1,97		None					0		Existing	4.4.1				ng First Flo		
Roof	31				<u> </u>			30	24	Remove	a 4.2.1	-A2		Existin	ng First Flo	oor	
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ID 1	Type	Area	U-Fa	-		GC ²	Azm	Stat			zing ⁻	<u> </u>			on/Comn	nents	
	Skylight Window	4.0		Default Default	0.73	Default Default		New New		ouble Met				dition 2n dition 2n			
	Window	20.0		Default Default	0.67	Default	45			ouble Nor				dition 2n			
	Window	20.0		Default		Default		New		ouble Nor				Addition 2nd Floor			
	Window	7.0		Default	0.67	Default		New		ouble Nor				Addition 2nd Floor			
	Window	4.0 13.3		Default Default	0.67 0.67	Default Default	90	New New		ouble Nor				dition 2n dition 2n			
	Window Window	36.7		Default Default		Default		New		ouble Nor					cond Floo	r	
	Window	68.0		Default	0.67	Default		New							ng Second Floor		
10	Window	110.1	0.550	Default	0.67	Default	180	Remo	ved D	ouble Nor	Metal	Clear			ting Second Floor		
	Window	8.3		Default	0.67	Default	90			ouble Nor					ting Second Floor		
	Window Window	4.0 14.0		Default Default	0.67 0.67	Default Default	270	Remo Existir		ouble Nor ouble Nor					ting Second Floor ting Second Floor		
	Skylight	11.0		Default Default	0.83	Default	30			ngle Meta				isting Fir		'	
	Window	7.6		Default	0.67	Default		Existir		ouble Nor				isting Fir			
	Window	7.6		Default		Default		Existir	9	ouble Nor	Metal	Clear	Exi	isting Fir	st Floor		
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	RIOR SI	71			rabio ire	iii Otanac	100, 111 11	- Lu	ocioa v	alac							
		., ., ., ., .,			Wind	ow		Overh	ang			Left Fir	า		Right Fi	in	
ID	Exterior	Shade Ty	/pe S	SHGC	Hgt				LExt	RExt	Dist	Len	Hgt	Dist	Len	Hgt	
	None			1.00													
	Bug Screen			0.76													
	Bug Screen Bug Screen			0.76 0.76						-							
	Bug Screen			0.76													
6	Bug Screen	1		0.76													
	Bug Screen			0.76													
	Bug Screen			0.76										-			
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	Bug Screen			0.76													
12	Bug Screen			0.76													
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	Bug Screen Bug Screen			0.76						+							
	23.00m		I	5.70		II.	I						<u> </u>	1	I.	1	
Energ	yPro 5.1 by	EnergySo	ft Use	er Number	: 2100	Run	Code: 20	010-10-	11T19:	36:00	ID:	8360P			Pag	ge 7 of 13	

CE	RTIFIC	ATE (OF C	ОМРІ	IAN	CE: F	Resid	enti	al				(Part	t 4 c	of 5)		CF	-1R
	t Name						lding Typ		Single				ition Alo				Date	
East	Manhatt	an E+A	SFR (4.3%) I	BASE	CAS			Multi F	am	nily 🗷	2 Exis	ting+ Ad	ddition	n/Altera	tion 1	0/1	3/2010
OPA	QUE SUF	RFACE D	ETAIL	.S														
Surfa	ice	U-			Insulatio							Jo	int Appe	endix				
Тур				Exterio	r Frame	Interior	Frame				Status		4			cation/0		
Roof	1,19							30	_	_	xisting					ing First		
Wall	19							0		_		4.3.1-				ing First		
Door Wall	1 6	_				+		225	-			4.5.1 4.3.1				ing First		
Wall	2	_				1		135		_		_	4.3.1-A1			ing First		
Wall	2							45					4.3.1-A1			Existing First Floor Existing First Floor		
Wall	7							315			xisting					Existing First Floor		
Wall	8							C				4.3.1-				ing First		
Wall	21							180			xisting					ing First		
Wall	49							90		_		4.3.1-				ing First		
Wall	39	7 0.356	None					270	9	0 E	xisting	4.3.1-	A1		Exist	ing First	Floo	or
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	Window	7.6		Default		Default		Existin		oub	ole Non I			E	xisting F			
	Window	20.0		Default		Default		Existin			ole Non I				xisting F			
19	Window	7.6	0.550	Default	0.67	Default		Existir		oub	ole Non I							
	Window	24.0	0.550			Default		Existir								kisting First Floor		
	Window	136.0		Default		Default		Existir								sting First Floor		
	Window	28.5		Default		Default		Existir								sting First Floor		
	Window	37.1		Default		Default		Existin								ting First Floor ting First Floor		
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HVAC SYSTEMS															•			
System Name		Qty.		ating Typ		Min. I				ng Type		Min.				stat Type	\Box	Status
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System Name		Heating				Cooling			Duct Location			1		Duct R-Valu	Ducts Tested	?	Status	
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MANDATORY MEASURES SUMMARY: Residential

(Page 1 of 3)

MF-1R

Project Name

East Manhattan E+A SFR (4.3%) BASE CASE

10/13/2010

NOTE: Low-rise residential buildings subject to the Standards must comply with all applicable mandatory measures listed, regardless of the compliance approach used. More stringent energy measures listed on the Certificate of Compliance (CF-1R, CF-1R-ADD, or CF-1R-ALT Form) shall supersede the items marked with an asterisk (*) below. This Mandatory Measures Summary shall be incorporated into the permit documents, and the applicable features shall be considered by all parties as minimum component performance specifications whether they are shown elsewhere in the documents or in this summary. Submit all applicable sections of the MF-1R Form with plans.

Building Envelope Measures:

- §116(a)1: Doors and windows between conditioned and unconditioned spaces are manufactured to limit air leakage.
- §116(a)4: Fenestration products (except field-fabricated windows) have a label listing the certified U-Factor, certified Solar Heat Gain Coefficient (SHGC), and infiltration that meets the requirements of §10-111(a).
- §117: Exterior doors and windows are weather-stripped; all joints and penetrations are caulked and sealed.
- §118(a): Insulation specified or installed meets Standards for Insulating Material. Indicate type and include on CF-6R Form.
- §118(i): The thermal emittance and solar reflectance values of the cool roofing material meets the requirements of §118(i) when the installation of a Cool Roof is specified on the CF-1R Form.
- *§150(a): Minimum R-19 insulation in wood-frame ceiling or equivalent U-factor.
- §150(b): Loose fill insulation shall conform with manufacturer's installed design labeled R-Value.
- *§150(c): Minimum R-13 insulation in wood-frame wall or equivalent U-factor.
- *§150(d): Minimum R-13 insulation in raised wood-frame floor or equivalent U-factor.
- §150(f): Air retarding wrap is tested, labeled, and installed according to ASTM E1677-95(2000) when specified on the CF-1R Form.
- §150(g): Mandatory Vapor barrier installed in Climate Zones 14 or 16.
- §150(I): Water absorption rate for slab edge insulation material alone without facings is no greater than 0.3%; water vapor permeance rate is no greater than 2.0 perm/inch and shall be protected from physical damage and UV light deterioration.

Fireplaces, Decorative Gas Appliances and Gas Log Measures:

- §150(e)1A: Masonry or factory-built fireplaces have a closable metal or glass door covering the entire opening of the firebox.
- §150(e)1B: Masonry or factory-built fireplaces have a combustion outside air intake, which is at least six square inches in area and is equipped with a with a readily accessible, operable, and tight-fitting damper and or a combustion-air control device.
- §150(e)2: Continuous burning pilot lights and the use of indoor air for cooling a firebox jacket, when that indoor air is vented to the outside of the building, are prohibited.

Space Conditioning, Water Heating and Plumbing System Measures:

- §110-§113: HVAC equipment, water heaters, showerheads, faucets and all other regulated appliances are certified by the Energy Commission.
- §113(c)5: Water heating recirculation loops serving multiple dwelling units and High-Rise residential occupancies meet the air release valve, backflow prevention, pump isolation valve, and recirculation loop connection requirements of §113(c)5.
- §115: Continuously burning pilot lights are prohibited for natural gas: fan-type central furnaces, household cooking appliances (appliances with an electrical supply voltage connection with pilot lights that consume less than 150 Btu/hr are exempt), and pool and spa heaters.
- §150(h): Heating and/or cooling loads are calculated in accordance with ASHRAE, SMACNA or ACCA.
- §150(i): Heating systems are equipped with thermostats that meet the setback requirements of Section 112(c).
- §150(j)1A: Storage gas water heaters rated with an Energy Factor no greater than the federal minimal standard are externally wrapped with insulation having an installed thermal resistance of R-12 or greater.
- §150(j)1B: Unfired storage tanks, such as storage tanks or backup tanks for solar water-heating system, or other indirect hot water tanks have R-12 external insulation or R-16 internal insulation where the internal insulation R-value is indicated on the exterior of the tank.
- §150(j)2: First 5 feet of hot and cold water pipes closest to water heater tank, non-recirculating systems, and entire length of recirculating sections of hot water pipes are insulated per Standards Table 150-B.
- §150(j)2: Cooling system piping (suction, chilled water, or brine lines), and piping insulated between heating source and indirect hot water tank shall be insulated to Table 150-B and Equation 150-A.
- §150(j)2: Pipe insulation for steam hydronic heating systems or hot water systems >15 psi, meets the requirements of Standards Table 123-A.
- §150(j)3A: Insulation is protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind.
- §150(j)3A: Insulation for chilled water piping and refrigerant suction lines includes a vapor retardant or is enclosed entirely in conditioned space.
- §150(j)4: Solar water-heating systems and/or collectors are certified by the Solar Rating and Certification Corporation.

MANDATORY MEASURES SUMMARY: Residential	(Page 2 of 3)	MF-1R
Project Name		Date
Fast Manhattan F+A SFR (4 3%) BASE CASE		10/13/2010

§150(m)1: All air-distribution system ducts and plenums installed, are sealed and insulated to meet the requirements of CMC Sections 601, 602, 603, 604, 605 and Standard 6-5; supply-air and return-air ducts and plenums are insulated to a minimum installed level of R-4.2 or enclosed entirely in conditioned space. Openings shall be sealed with mastic, tape or other duct-closure system that meets the applicable requirements of UL 181, UL 181A, or UL 181B or aerosol sealant that meets the requirements of UL 723. If mastic or tape is used to seal openings greater than 1/4 inch, the combination of mastic and either mesh or tape shall be used

§150(m)1: Building cavities, support platforms for air handlers, and plenums defined or constructed with materials other than sealed sheet metal, duct board or flexible duct shall not be used for conveying conditioned air. Building cavities and support platforms may contain ducts. Ducts installed in cavities and support platforms shall not be compressed to cause reductions in the cross-sectional area of the ducts.

§150(m)2D: Joints and seams of duct systems and their components shall not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.

§150(m)7: Exhaust fan systems have back draft or automatic dampers.

§150(m)8: Gravity ventilating systems serving conditioned space have either automatic or readily accessible, manually operated dampers.

§150(m)9: Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material.

§150(m)10: Flexible ducts cannot have porous inner cores.

§150(o): All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2-2007 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. Window operation is not a permissible method of providing the Whole Building Ventilation required in Section 4 of that Standard.

Pool and Spa Heating Systems and Equipment Measures:

§114(a): Any pool or spa heating system shall be certified to have: a thermal efficiency that complies with the Appliance Efficiency Regulations; an on-off switch mounted outside of the heater; a permanent weatherproof plate or card with operating instructions; and shall not use electric resistance heating or a pilot light.

§114(b)1: Any pool or spa heating equipment shall be installed with at least 36" of pipe between filter and heater, or dedicated suction and return lines, or built-up connections for future solar heating.

§114(b)2: Outdoor pools or spas that have a heat pump or gas heater shall have a cover.

§114(b)3: Pools shall have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.

§150(p): Residential pool systems or equipment meet the pump sizing, flow rate, piping, filters, and valve requirements of §150(p).

Residential Lighting Measures:

§150(k)1: High efficacy luminaires or LED Light Engine with Integral Heat Sink has an efficacy that is no lower than the efficacies contained in Table 150-C and is not a low efficacy luminaire as specified by §150(k)2.

§150(k)3: The wattage of permanently installed luminaires shall be determined as specified by §130(d).

§150(k)4: Ballasts for fluorescent lamps rated 13 Watts or greater shall be electronic and shall have an output frequency no less than 20 kHz.

§150(k)5: Permanently installed night lights and night lights integral to a permanently installed luminaire or exhaust fan shall contain only high efficacy lamps meeting the minimum efficacies contained in Table 150-C and shall not contain a line-voltage socket or line-voltage lamp holder; OR shall be rated to consume no more than five watts of power as determined by §130(d), and shall not contain a medium screw-base socket.

§150(k)6: Lighting integral to exhaust fans, in rooms other than kitchens, shall meet the applicable requirements of §150(k).

§150(k)7: All switching devices and controls shall meet the requirements of §150(k)7.

§150(k)8: A minimum of 50 percent of the total rated wattage of permanently installed lighting in kitchens shall be high efficacy. EXCEPTION: Up to 50 watts for dwelling units less than or equal to 2,500 ft₂ or 100 watts for dwelling units larger than 2,500 ft₂ may be exempt from the 50% high efficacy requirement when: all low efficacy luminaires in the kitchen are controlled by a manual on occupant sensor, dimmer, energy management system (EMCS), or a multi-scene programmable control system; and all permanently installed luminaries in garages, laundry rooms, closets greater than 70 square feet, and utility rooms are high efficacy and controlled by a manual-on occupant sensor.

§150(k)9: Permanently installed lighting that is internal to cabinets shall use no more than 20 watts of power per linear foot of illuminated cabinet.

MANDATORY MEASURES SUMMARY: Residential	(Page 3 of 3)	MF-1R
Project Name		Date
East Manhattan E+A SFR (4.3%) BASE CASE		10/13/2010

§150(k)10: Permanently installed luminaires in bathrooms, attached and detached garages, laundry rooms, closets and utility rooms shall be high efficacy.

EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by a manual-on occupant sensor certified to comply with the applicable requirements of §119.

EXCEPTION 2: Permanently installed low efficacy luminaires in closets less than 70 square feet are not required to be controlled by a manual-on occupancy sensor.

§150(k)11: Permanently installed luminaires located in rooms or areas other than in kitchens, bathrooms, garages, laundry rooms, closets, and utility rooms shall be high efficacy luminaires. EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided they are controlled by either a dimmer switch that complies with the applicable requirements of §119, or by a manual-on occupant sensor that complies with the applicable requirements of §119. EXCEPTION 2: Lighting in detached storage building less than 1000 square feet located on a residential site is not required to comply with §150(k)11.

§150(k)12: Luminaires recessed into insulated ceilings shall be listed for zero clearance insulation contact (IC) by Underwriters Laboratories or other nationally recognized testing/rating laboratory; and have a label that certifies the luminaire is airtight with air leakage less then 2.0 CFM at 75 Pascals when tested in accordance with ASTM E283; and be sealed with a gasket or caulk between the luminaire housing and ceiling.

§150(k)13: Luminaires providing outdoor lighting, including lighting for private patios in low-rise residential buildings with four or more dwelling units, entrances, balconies, and porches, which are permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy. EXCEPTION 1: Permanently installed outdoor low efficacy luminaires shall be allowed provided that they are controlled by a manual on/off switch, a motion sensor not having an override or bypass switch that disables the motion sensor, and one of the following controls: a photocontrol not having an override or bypass switch that disables the photocontrol; OR an astronomical time clock not having an override or bypass switch that disables the astronomical time clock; OR an energy management control system (EMCS) not having an override or bypass switch that allows the luminaire to be always on EXCEPTION 2: Outdoor luminaires used to comply with Exception1 to §150(k)13 may be controlled by a temporary override switch which bypasses the motion sensing function provided that the motion sensor is automatically reactivated within six hours. EXCEPTION 3: Permanently installed luminaires in or around swimming pool, water features, or other location subject to Article 680 of the California Electric Code need not be high efficacy luminaires.

§150(k)14: Internally illuminated address signs shall comply with Section 148; OR not contain a screw-base socket, and consume no more than five watts of power as determined according to §130(d).

§150(k)15: Lighting for parking lots and carports with a total of for 8 or more vehicles per site shall comply with the applicable requirements in Sections 130, 132, 134, and 147. Lighting for parking garages for 8 or more vehicles shall comply with the applicable requirements of Sections 130, 131, 134, and 146.

§150(k)16: Permanently installed lighting in the enclosed, non-dwelling spaces of low-rise residential buildings with four or more dwelling units shall be high efficacy luminaires. EXCEPTION: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by an occupant sensor(s) certified to comply with the applicable requirements of §119.

Project Name East Manhattan E+A SFR	(4.3%) B	ASE CASE					13/2010
System Name Existing + Addition System	า						Area 2,742
ENGINEERING CHECKS		SYSTEM LOAD					2,172
	1	STOTEWILOAD	COIL	COOLING P	EAV	COII H	TG. PEAK
Number of Systems Heating System	'		CFM	Sensible	Latent	CFM	Sensible
Output per System	75,000	Total Room Loads	2,254	51,906	3,267	1,060	53,94
Total Output (Btuh)	75,000	Return Vented Lighting		0	0,20.	-,,,,,	00,04
Output (Btuh/sqft)	27.4	Return Air Ducts		2,328			2,62
Cooling System		Return Fan		0			
Output per System	0	Ventilation	0	0	0	0	(
Total Output (Btuh)	0	Supply Fan		0			
Total Output (Tons)	0.0	Supply Air Ducts		2,328			2,622
Total Output (Btuh/sqft)	0.0			, , ,			_,-,- <u>_</u>
Total Output (sqft/Ton)	0.0	TOTAL SYSTEM LOAD		56,562	3,267		59,18
Air System				,	·		
CFM per System	855	HVAC EQUIPMENT SELECTION					
Airflow (cfm)	855			0	0		75,00
Airflow (cfm/sqft)	0.31						-
Airflow (cfm/Ton)	0.0						
Outside Air (%)	0.0 %	Total Adjusted System Output		0	0		75,000
Outside Air (cfm/sqft)	0.00	(Adjusted for Peak Design conditions)		<u></u>			
Note: values above given at ARI	conditions	TIME OF SYSTEM PEAK			Aug 3 PM		Jan 1 AN
Outside Air O cfm Supply Fan 855 cfm	68 °F Heating 0	119 °F Coil	→		RC	ОМ	17 °F
Outside Air O cfm 80 / 63 °F		Airstream Temperatures at Time of	-> [чеак)	6 RC	ОМ	/ 54 °F / 63 °F

BUILDING ENERGY ANALYSIS REPORT

PROJECT:

E. Manhattan E+A SFR (15%) All ECM's 1516 Ruhland Avenue Manhattan Beach, CA 90266

Project Designer:

Robert Treman Architecture 2100 N. Sepulveda Blvd. #11 Manhattan Beach, CA 90266 (310) 379-8567

Report Prepared by:

Rick Newton NEWTON ENERGY 1401 19th Street Manhattan Beach, CA 90266 310 375-2699



Job Number:

8360P

Date:

10/16/2010

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2008 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

EnergyPro 5.1 by EnergySoft User Number: 2100 RunCode: 2010-10-16T18:46:56 ID: 8360P

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Form CF-1R Certificate of Compliance	3
Form MF-1R Mandatory Measures Summary	10
HVAC System Heating and Cooling Loads Summary	13

EnergyPro 5.1 by EnergySoft Job Number: ID: 8360P User Number: 2100

PERF	ORMA	NCE C	ERTIFICAT	E: R	eside	ential			(Part 1	of 5)	CF-1R
Project Na F <i>Manh</i>		+A SFR (1	5%) All ECM's		ng Type		gle Fami ti Family		Addition Alone Existing+ Additio	n/Alteration	Date 10/16/2010
Project Ad	dress	,	•	Califo		rgy Clima		Total	Cond. Floor Area	Addition	# of Stories
			anhattan Bead	_		ate Zon	e 06		2,742	310	2
FIELD	_		N ENERGY		_	_					
⊐ Yes	✓ No	HERS N	Measures If	Yes, A	A CF-4	IR mus	st be p	rovi	ded per Part	2 of 5 of th	nis form.
☑ Yes	□ No	Special	Features If	Yes, s	see Pa	art 2 of	5 of th	is fo	orm for details	S.	
NSUL	ATION					Area	Spe	cia			
Constr	uction	Type		Cavi	ty	(ft ²)	Fea	ture	es (see Part	2 of 5)	Status
oof	Wood Fra	med Rafter		R-19		306					New
/all	Wood Fra	med		R-13		607					New
oof	Wood Fra	med Attic		R-30		1,654					Altered
'all	Wood Fra	med		None		2,146					Existing
oor	Wood Fra	med w/Crawl	Space	None		1,975					Existing
oor	Opaque D)oor		None		18					New
ENIEC	STRATIO	ON	U-						Exterior		
Orienta		Area(<i>ft²</i>)	_	HGC	Overl	nana	Sidefi	ne	Shades		Status
kylight	411011	4.0	0.710	0.73	none	lulig	none	113	None		New
ear (S)		108.7	0.550	0.67	none		none		Bug Screen		New
ont (NE)		20.0	0.550	0.67	none		none		Bug Screen		New
ght (NW))	20.0	0.550	0.67	none		none		Bug Screen		New
ght (W)		7.0	0.550	0.67	none		none		Bug Screen		New
eft (E)		4.0	0.550	0.67	none		none		Bug Screen		New
ont (N)		13.3	0.550	0.67	none		none		Bug Screen		New
eft (E)		45.4	0.550	0.67	none		none		Bug Screen		Existing
ight (W)		64.0	0.550	0.67	none		none		Bug Screen		Existing
kylight		11.0	0.390	0.29	none		none		None		Altered
ear (SW)		7.6	0.550	0.67	none		none		Bug Screen		Existing
IVAC	SYSTE	MS									
Qty. I	Heating		Min. Eff	Coc	oling		Min	. Eff	f The	rmostat	Status
1 (Central Furr	пасе	95% AFUE	No C	Cooling		13.0	SEER	Setback		Altered
11/40	DICTRI	DUTION								\at	
ocati		BUTION	eating	Coc	oling	Duc	t Loca	tior		Ouct R-Value	Status
EVV EXIST	ing + Additi	on S ₃ Duct	ea	Ducte	u	Allic, C	eiling Ins	, verile	<i>90</i> 4	1.2	Altered
VATE	R HEAT	ING									
	Туре		Gall	ons	Min.	Eff	Distril	outi	on		Status
nergyPro	5.1 by Ene	ergySoft U	ser Number: 2100	Run	Code: 2	010-10-16	T18:46:5	6	ID: 8360P		Page 3 of 13

PERFORM/	ANCE CE	RTIFICA					1 of 5)	CF-1R
Project Name E. Manhattan E	+Δ SFR (1F	5%) All ECM				Addition Alone Existing+ Addition	n/Alteration	Date 10/16/2010
Project Address	•	•	Calif	ornia Energy Clin	nate Zone Tota	l Cond. Floor Area	Addition	# of Stories
1516 Ruhland A				A Climate Zo	ne 06	2,742	310	2
FIELD INSF	PECTION	ENERGY	Y CHE	CKLIST				
☐ Yes ☑ No	HERS M	leasures	If Yes, A	A CF-4R mi	ust be provi	ded per Part	2 of 5 of th	nis form.
☑ Yes □ No	Special I	eatures	If Yes,	see Part 2 d	of 5 of this for	orm for detail	S.	
INSULATION				Area	a Specia	I		
Construction	Type		Cav	ity (<i>ft</i> ²)	Feature	es (see Part	2 of 5)	Status
FENESTRATI	_	U-	SHCC	Overheng	Cidofino	Exterior		Statue
Orientation Left (SE)	Area(ft ²)	Factor 9	0.67	Overhang	Sidefins	Shades Bug Screen		Status Existing
Front (NE)	7.6	0.550	0.67	none	none	Bug Screen		Existing
Right (NW)	27.6	0.550	0.67	none	none	Bug Screen		Existing
Front (N)	24.0	0.550	0.67	none	none	Bug Screen		Existing
Rear (S)	164.5	0.550	0.67	none	none	Bug Screen		Existing
HVAC SYSTE		Min. Ef	f Co	oling	Min. Ef	f The	rmostat	Status
				- <u>J</u>		-		
HVAC DISTR Location		eating	Co	oling Du	ıct Locatio		Duct R-Value	Status
200411011		aung			iot Eooutio	···	TTUIGO	Otatao
WATER HEA	TING	0 - 1	llana	Mire F#	Dietaileeri			Chaline
Qty. Type		Ga	llons	Min. Eff	Distributi	OII		Status
EnergyPro 5.1 by En	nergySoft Us	er Number: 2100) Rui	nCode: 2010-10-	16T18:46:56	ID: 8360P		Page 4 of 13

PERFORMANCE CERTIFICATE:	Residential	(Part 2 of 5)	CF-1R
Project Name E. Manhattan E+A SFR (15%) All ECM's	Building Type	☐ Addition Alone ☐ Existing+ Addition/Alteration	Date 10/16/2010
SPECIAL FEATURES INSPECTION The enforcement agency should pay special attention justification and documentation, and special verification determines the adequacy of the justification, and may the special justification and documentation submitted.	to the items specified in this cho on to be used with the performan reject a building or design that o	nce approach. The enforcement ag	jency
The HVAC System Carrier Corp. 58UVB080-20 does not incl		on is not necessary.	
LIEDO DECLUDED VEDICIOATION	.,,		
HERS REQUIRED VERIFICATION Items in this section require field testing and/or very completed CF-4R form for each of the measures	rerification by a certified HER	S Rater. The inspector must reliven.	eceive a
	<u> </u>		
EnergyPro 5.1 by EnergySoft	RunCode: 2010-10-16T18:46:56	ID: 8360P	Page 5 of 13

	IIIIIAIIOE (ICAIL.	Residen	ıtıaı	(1 c	art 3 of 5)	CF-1R
Project Name				Building Type				Date
	tan E+A SFR (☐ Multi Family	☑ Existing+	Addition/Alteration	10/16/201
NNUAL E	NERGY USE S							
TDV (k)		ndard P	roposed	Margin				
(KI	Btu/ft ² -yr)	37.05	27.52	9.53				
Space Hea	•	37.05 16.93	27.52 13.55	9.53 3.38				
Space Coo ans	oling	9.26	7.93	1.33				
ans Iomestic H	Hot Water	15.31	15.31	0.00				
umps	ioi water	0.00	0.00	0.00				
<u>po</u>	Totals	78.54	64.31	14.23				
ercent Be	etter Than Stan	dard:		18.1 %				
В	UILDING	COMP	LIES	- NO HEI	RS VERIFI	CATIO	N REQUIR	ED
	<u> </u>					0711101		enestration
	ont Orientation:		, ,	0 deg	Ext. Walls/R	oof Wa	all Area	Area
	Dwelling Units:			1.00	(N)		683	65
	ıble at Site:			ıral Gas	(E)		855	57
aised Floo			1,	,975	(S)		807	281
	ade Area:			0 8.1	(W)		946	119 15
•	eiling Height:	Easta::		8. 1).55	Roof		1,975 TOTAL:	536
enestratio	on Average U Average S			0.67	-	enestration/(_	19.6 %
EMARKS		nao.		7.07		enestration/C	JI A Hallo.	19.0 /6
ASE CASE (i 0% CASE: CM-9 Attic I CM-5 Repla	(6.2%): Assuming ex Insul. Upgrade: Assu ace Existing Furnace ght Upgrade: 5.9%.	umed R-19 (L			etal Clear. Standard (Gas 50 gal or L	ess water heater.	
ASE CASE (I 0% CASE: CM-9 Attic I. CM-5 Repla CM-7 Skylig	Insul. Upgrade: Assu ace Existing Furnace	umed R-19 (I e: 9.1%;	E) to R-30: 6.9		etal Clear. Standard (Gas 50 gal or L	ess water heater.	
ASE CASE (10% CASE: CM-9 Attic II. CM-5 Repla CM-7 Skylig CM-T Skylig CM-T COMPLETE	Insul. Upgrade: Assu ace Existing Furnace ght Upgrade: 5.9%.	wmed R-19 (le: 9.1%; MPLIAN(ce lists the	E) to R-30: 6.9 CE e building formulations for the comment of th	9%; eatures and sp	pecifications nee		ess water heater.	
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	t Name	5.40	5D (45	0/\ 4##	-0.4	Bui	lding Typ			Family [/ Altorati	Date	
		E+AS			:CM's			יו ע	∕lulti Fa	amily i	∠ EXIS	sting+ Ad	altion	Alterati	on 10/1	6/2010
		RFACE	DETAIL			_		1				· · · · · · · · · · · · · · · · · · ·	I'			
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Wall			R-13					45	90		4.3.1				on 2nd Flo	
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	Window	20.0	0.550			Default		New		uble Non				ddition 2r		
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	Window	8.3		Default		Default				uble Non					cond Floo	
12	Window	4.0		Default		Default	270	Remov	red Do	uble Non			E.	xisting Se	cond Floo	r
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CE	RTIF	FICA	TE C	OF C	OMPL	IAN	CE: F	Resid	enti	al			(Pai	t 4 (of 5)		C	F-1R
-	t Name		4 05	-D /45	0/\	-014-	Bui	lding Typ		Single Multi F			dition Al sting+ A		n/Altar	otio	Date	
			ACE D		%) All I	=CIM'S				viuiti F	anny		sung+ F	Additio	III/AILEI	allu	10/1	6/2010
Surfa		SURF	U-	EIAIL		nsulatio	n .					Ι	oint App	endix	,			
Тур		Area	_	Cavity			Interior	Frame	Azm	Tilt	Status	"	4	Jeriaix		oca	tion/Con	nments
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Wall		495	0.356						90		Existing						First Flo	
Wall		397	0.356	None					270	90	Existing	4.3.1	-A1		Ex	sting	First Flo	or
FENI	FSTR	ATIO	N SHR	FACE	<u> </u> DETAIL	9												
ID	Тур		Area	U-Fa			GC ²	Azm	Stati	ıs	Gla	zing 7	Type		Loc	atio	n/Comm	nents
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	Windov Windov		7.6 24.0	0.550 0.550			Default		Existin Existin		ouble Non				Existing			
	Windov		136.0	0.550			Default	180	Existin	g D	ouble Non				Existing			
	Windov		28.5	0.550			Default		Existin		ouble Non				Existing			
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CERTIFICATE	OF	: CC	MP	LIAN	CE	: Re	esic	net	tial				(P	art 5	5 of :	5)	С	F-1R
Project Name		***	·			Buildi	ng Ty			igle Fam							Dat	
E. Manhattan E+A		•		ECM's	;				IJ Mu	lti Famil	у	∠ Exi	sting-	- Adai	tion/A	Iteration	10/	16/2010
BUILDING ZONE IN	IFOR	MAII	ON							Floor A	<u></u>	/f+ ² \						
System Name			Zor	ne Name)	H	Ne	w		rioor A kisting		(π.) Itered	l R	emove	ed '	Volume	Y,	ear Built
NEW Existing + Addition	-		on 2nd I	Floor				310								2,511		
				nd Floor					<u> </u>			45				3,702		
		Existin	ng First	Floor		\rightarrow			┼		<u> </u>	1,97	75			15,998	195	6
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HVAC SYSTEMS					-100	uis		- 070	1			2, 10	,					
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pre-altered for above			Centra	l Furnace	,	80% A	FUE	No Co	ooling			13.0 S	SEER	Setba	ck			
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HVAC DISTRIBUTION	ON																	
System Name			Hea	tina		Cool	ling		Г	ouct Loc	ation			Duc R-Val		Ducts Tested	,	Status
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System Name	Qty.		Туре	0	г	Distribu	ution			iput ituh)	Ca (ga		actor or RE		oss or Pilot	Insul. I Value		Status
Standard Gas 50 gal or Lo			all Gas			en Pipe			(D	40,000	(ya		0.53		n/a	n/a		Existing
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MULTI-FAMILY WA	TER	HEA	ING			Dining	1	مالد		HYDR	ON	IC HE	ATII	1G S.	YSTE	M PIPIN	<u>G</u>	
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]i.i.		T		T	-	½" Ilatio									
	0.		Eff. Premium						Add ½" Insulation					١.	Pipe	Pipe		Insul.
Control	Qty.	HP		Plenum	1 OL	utside	Bur	red	<u> </u>	S	yste	m Nar	ne	+-	Length	Diame	ter	Thick.
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EnergyPro 5.1 by Energy	/Soft	HSE	r Numb	er: 2100		RunC	ode.	2010-	10-16	T18:46:5	6	ID:	8360				Pai	ae 9 of 13

MANDATORY MEASURES SUMMARY: Residential

(Page 1 of 3)

MF-1R

Project Name

E. Manhattan E+A SFR (15%) All ECM's

10/16/2010

NOTE: Low-rise residential buildings subject to the Standards must comply with all applicable mandatory measures listed, regardless of the compliance approach used. More stringent energy measures listed on the Certificate of Compliance (CF-1R, CF-1R-ADD, or CF-1R-ALT Form) shall supersede the items marked with an asterisk (*) below. This Mandatory Measures Summary shall be incorporated into the permit documents, and the applicable features shall be considered by all parties as minimum component performance specifications whether they are shown elsewhere in the documents or in this summary. Submit all applicable sections of the MF-1R Form with plans.

Building Envelope Measures:

- §116(a)1: Doors and windows between conditioned and unconditioned spaces are manufactured to limit air leakage.
- §116(a)4: Fenestration products (except field-fabricated windows) have a label listing the certified U-Factor, certified Solar Heat Gain Coefficient (SHGC), and infiltration that meets the requirements of §10-111(a).
- §117: Exterior doors and windows are weather-stripped; all joints and penetrations are caulked and sealed.
- §118(a): Insulation specified or installed meets Standards for Insulating Material. Indicate type and include on CF-6R Form.
- §118(i): The thermal emittance and solar reflectance values of the cool roofing material meets the requirements of §118(i) when the installation of a Cool Roof is specified on the CF-1R Form.
- *§150(a): Minimum R-19 insulation in wood-frame ceiling or equivalent U-factor.
- §150(b): Loose fill insulation shall conform with manufacturer's installed design labeled R-Value.
- *§150(c): Minimum R-13 insulation in wood-frame wall or equivalent U-factor.
- *§150(d): Minimum R-13 insulation in raised wood-frame floor or equivalent U-factor.
- §150(f): Air retarding wrap is tested, labeled, and installed according to ASTM E1677-95(2000) when specified on the CF-1R Form.
- §150(g): Mandatory Vapor barrier installed in Climate Zones 14 or 16.
- §150(I): Water absorption rate for slab edge insulation material alone without facings is no greater than 0.3%; water vapor permeance rate is no greater than 2.0 perm/inch and shall be protected from physical damage and UV light deterioration.

Fireplaces, Decorative Gas Appliances and Gas Log Measures:

- §150(e)1A: Masonry or factory-built fireplaces have a closable metal or glass door covering the entire opening of the firebox.
- §150(e)1B: Masonry or factory-built fireplaces have a combustion outside air intake, which is at least six square inches in area and is equipped with a with a readily accessible, operable, and tight-fitting damper and or a combustion-air control device.
- §150(e)2: Continuous burning pilot lights and the use of indoor air for cooling a firebox jacket, when that indoor air is vented to the outside of the building, are prohibited.

Space Conditioning, Water Heating and Plumbing System Measures:

- §110-§113: HVAC equipment, water heaters, showerheads, faucets and all other regulated appliances are certified by the Energy Commission.
- §113(c)5: Water heating recirculation loops serving multiple dwelling units and High-Rise residential occupancies meet the air release valve, backflow prevention, pump isolation valve, and recirculation loop connection requirements of §113(c)5.
- §115: Continuously burning pilot lights are prohibited for natural gas: fan-type central furnaces, household cooking appliances (appliances with an electrical supply voltage connection with pilot lights that consume less than 150 Btu/hr are exempt), and pool and spa heaters.
- §150(h): Heating and/or cooling loads are calculated in accordance with ASHRAE, SMACNA or ACCA.
- §150(i): Heating systems are equipped with thermostats that meet the setback requirements of Section 112(c).
- §150(j)1A: Storage gas water heaters rated with an Energy Factor no greater than the federal minimal standard are externally wrapped with insulation having an installed thermal resistance of R-12 or greater.
- §150(j)1B: Unfired storage tanks, such as storage tanks or backup tanks for solar water-heating system, or other indirect hot water tanks have R-12 external insulation or R-16 internal insulation where the internal insulation R-value is indicated on the exterior of the tank.
- §150(j)2: First 5 feet of hot and cold water pipes closest to water heater tank, non-recirculating systems, and entire length of recirculating sections of hot water pipes are insulated per Standards Table 150-B.
- §150(j)2: Cooling system piping (suction, chilled water, or brine lines), and piping insulated between heating source and indirect hot water tank shall be insulated to Table 150-B and Equation 150-A.
- §150(j)2: Pipe insulation for steam hydronic heating systems or hot water systems >15 psi, meets the requirements of Standards Table 123-A.
- §150(j)3A: Insulation is protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind.
- §150(j)3A: Insulation for chilled water piping and refrigerant suction lines includes a vapor retardant or is enclosed entirely in conditioned space.
- §150(j)4: Solar water-heating systems and/or collectors are certified by the Solar Rating and Certification Corporation.

MANDATORY MEASURES SUMMARY: Residential	(Page 2 of 3)	MF-1R
Project Name		Date
E. Manhattan E+A SFR (15%) All ECM's		10/16/2010

§150(m)1: All air-distribution system ducts and plenums installed, are sealed and insulated to meet the requirements of CMC Sections 601, 602, 603, 604, 605 and Standard 6-5; supply-air and return-air ducts and plenums are insulated to a minimum installed level of R-4.2 or enclosed entirely in conditioned space. Openings shall be sealed with mastic, tape or other duct-closure system that meets the applicable requirements of UL 181, UL 181A, or UL 181B or aerosol sealant that meets the requirements of UL 723. If mastic or tape is used to seal openings greater than 1/4 inch, the combination of mastic and either mesh or tape shall be used

§150(m)1: Building cavities, support platforms for air handlers, and plenums defined or constructed with materials other than sealed sheet metal, duct board or flexible duct shall not be used for conveying conditioned air. Building cavities and support platforms may contain ducts. Ducts installed in cavities and support platforms shall not be compressed to cause reductions in the cross-sectional area of the ducts.

§150(m)2D: Joints and seams of duct systems and their components shall not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.

§150(m)7: Exhaust fan systems have back draft or automatic dampers.

§150(m)8: Gravity ventilating systems serving conditioned space have either automatic or readily accessible, manually operated dampers.

§150(m)9: Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material.

§150(m)10: Flexible ducts cannot have porous inner cores.

§150(o): All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2-2007 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. Window operation is not a permissible method of providing the Whole Building Ventilation required in Section 4 of that Standard.

Pool and Spa Heating Systems and Equipment Measures:

§114(a): Any pool or spa heating system shall be certified to have: a thermal efficiency that complies with the Appliance Efficiency Regulations; an on-off switch mounted outside of the heater; a permanent weatherproof plate or card with operating instructions; and shall not use electric resistance heating or a pilot light.

§114(b)1: Any pool or spa heating equipment shall be installed with at least 36" of pipe between filter and heater, or dedicated suction and return lines, or built-up connections for future solar heating.

§114(b)2: Outdoor pools or spas that have a heat pump or gas heater shall have a cover.

§114(b)3: Pools shall have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.

§150(p): Residential pool systems or equipment meet the pump sizing, flow rate, piping, filters, and valve requirements of §150(p).

Residential Lighting Measures:

§150(k)1: High efficacy luminaires or LED Light Engine with Integral Heat Sink has an efficacy that is no lower than the efficacies contained in Table 150-C and is not a low efficacy luminaire as specified by §150(k)2.

§150(k)3: The wattage of permanently installed luminaires shall be determined as specified by §130(d).

§150(k)4: Ballasts for fluorescent lamps rated 13 Watts or greater shall be electronic and shall have an output frequency no less than 20 kHz.

§150(k)5: Permanently installed night lights and night lights integral to a permanently installed luminaire or exhaust fan shall contain only high efficacy lamps meeting the minimum efficacies contained in Table 150-C and shall not contain a line-voltage socket or line-voltage lamp holder; OR shall be rated to consume no more than five watts of power as determined by §130(d), and shall not contain a medium screw-base socket.

§150(k)6: Lighting integral to exhaust fans, in rooms other than kitchens, shall meet the applicable requirements of §150(k).

§150(k)7: All switching devices and controls shall meet the requirements of §150(k)7.

§150(k)8: A minimum of 50 percent of the total rated wattage of permanently installed lighting in kitchens shall be high efficacy. EXCEPTION: Up to 50 watts for dwelling units less than or equal to 2,500 ft² or 100 watts for dwelling units larger than 2,500 ft² may be exempt from the 50% high efficacy requirement when: all low efficacy luminaires in the kitchen are controlled by a manual on occupant sensor, dimmer, energy management system (EMCS), or a multi-scene programmable control system; and all permanently installed luminaries in garages, laundry rooms, closets greater than 70 square feet, and utility rooms are high efficacy and controlled by a manual-on occupant sensor.

§150(k)9: Permanently installed lighting that is internal to cabinets shall use no more than 20 watts of power per linear foot of illuminated cabinet.

MANDATORY MEASURES SUMMARY: Residential	(Page 3 of 3)	MF-1R
Project Name		Date
E. Manhattan E+A SFR (15%) All ECM's		10/16/2010

§150(k)10: Permanently installed luminaires in bathrooms, attached and detached garages, laundry rooms, closets and utility rooms shall be high efficacy.

EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by a manual-on occupant sensor certified to comply with the applicable requirements of §119.

EXCEPTION 2: Permanently installed low efficacy luminaires in closets less than 70 square feet are not required to be controlled by a manual-on occupancy sensor.

§150(k)11: Permanently installed luminaires located in rooms or areas other than in kitchens, bathrooms, garages, laundry rooms, closets, and utility rooms shall be high efficacy luminaires. EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided they are controlled by either a dimmer switch that complies with the applicable requirements of §119, or by a manual-on occupant sensor that complies with the applicable requirements of §119. EXCEPTION 2: Lighting in detached storage building less than 1000 square feet located on a residential site is not required to comply with §150(k)11.

§150(k)12: Luminaires recessed into insulated ceilings shall be listed for zero clearance insulation contact (IC) by Underwriters Laboratories or other nationally recognized testing/rating laboratory; and have a label that certifies the lumiunaire is airtight with air leakage less then 2.0 CFM at 75 Pascals when tested in accordance with ASTM E283; and be sealed with a gasket or caulk between the luminaire housing and ceiling.

§150(k)13: Luminaires providing outdoor lighting, including lighting for private patios in low-rise residential buildings with four or more dwelling units, entrances, balconies, and porches, which are permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy. EXCEPTION 1: Permanently installed outdoor low efficacy luminaires shall be allowed provided that they are controlled by a manual on/off switch, a motion sensor not having an override or bypass switch that disables the motion sensor, and one of the following controls: a photocontrol not having an override or bypass switch that disables the photocontrol; OR an astronomical time clock not having an override or bypass switch that disables the astronomical time clock; OR an energy management control system (EMCS) not having an override or bypass switch that allows the luminaire to be always on EXCEPTION 2: Outdoor luminaires used to comply with Exception1 to §150(k)13 may be controlled by a temporary override switch which bypasses the motion sensing function provided that the motion sensor is automatically reactivated within six hours. EXCEPTION 3: Permanently installed luminaires in or around swimming pool, water features, or other location subject to Article 680 of the California Electric Code need not be high efficacy luminaires.

§150(k)14: Internally illuminated address signs shall comply with Section 148; OR not contain a screw-base socket, and consume no more than five watts of power as determined according to §130(d).

§150(k)15: Lighting for parking lots and carports with a total of for 8 or more vehicles per site shall comply with the applicable requirements in Sections 130, 132, 134, and 147. Lighting for parking garages for 8 or more vehicles shall comply with the applicable requirements of Sections 130, 131, 134, and 146.

§150(k)16: Permanently installed lighting in the enclosed, non-dwelling spaces of low-rise residential buildings with four or more dwelling units shall be high efficacy luminaires. EXCEPTION: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by an occupant sensor(s) certified to comply with the applicable requirements of §119.

Project Name E. Manhattan E+A SFR (1	5%) All E	CM's					16/2010
System Name IEW Existing + Addition S	System						Area 2,742
ENGINEERING CHECKS) you can	SYSTEM LOAD					2,172
Number of Systems	1	OTOTEM EGAD	COII	COOLING P	EVK	COII H.	TG. PEAK
Heating System	·		CFM	Sensible	Latent	CFM	Sensible
Output per System	75,000	Total Room Loads	2,052		3,267	1,002	51,172
Total Output (Btuh)	75,000	Return Vented Lighting		0	,	-	21,111
Output (Btuh/sqft)	27.4	Return Air Ducts		2,133			2,48
Cooling System		Return Fan		0			,
Output per System	0	Ventilation	0	0	0	0	(
Total Output (Btuh)	0	Supply Fan		0	l		(
Total Output (Tons)	0.0	Supply Air Ducts		2,133			2,48
Total Output (Btuh/sqft)	0.0	117					
Total Output (sqft/Ton)	0.0	TOTAL SYSTEM LOAD		51,829	3,267		56,14
Air System					<u> </u>		
CFM per System	855	HVAC EQUIPMENT SELECTION					
Airflow (cfm)	855	Carrier Corp. 58UVB080-20		0	0		75,000
Airflow (cfm/sqft)	0.31						
Airflow (cfm/Ton)	0.0						
Outside Air (%)	0.0 %	Total Adjusted System Output		0	0		75,000
Outside Air (cfm/sqft)	0.00	(Adjusted for Peak Design conditions)		<u> </u>			
Note: values above given at ARI	conditions	TIME OF SYSTEM PEAK			Aug 3 PM		Jan 1 AN
Outside Air O cfm Supply Fan 855 cfm	Heating C	119 °F Coil	→		RC	ОМ	18 °F 70 °F
OUTSIDE SYSTEM PSYCHRO 79 / 63 Outside Air 0 cfm		Airstream Temperatures at Time of	Cooling F	Peak)	6 RC	ОМ	/ 54 °F / 63 °F

LIFE CYCLE COSTING SUMMARY

Proiect Name

LCC for E. Manhattan E+A SFR to 15% - 20 year

LCC-1

10/19/2010

ANNUAL ENERGY USE AND COST

			Electricity		Natural Gas		
Option	Description	Consumption (kWh)	Demand (kW)	Cost (\$)	Consumption (therms)	Cost (\$)	Simple Payback (years)
Base	East Manhattan E+A SFR BASE CASE	3,598	12	\$1,020	857	\$945	N/A
1	ECM-5 Replace Existing Furnace: 9.1%	3,598	12	\$1,020	793	\$872	22.0
2	ECM-7 Skylight Upgrade: 5.9%	3,496	12	\$997	854	\$943	17.5
3	ECM-9 Attic Insul. Upgrade: (E) to R-30: 6.9%	3,373	11	\$969	856	\$945	31.1
4	TOTAL: 15% CASE - All ECM's: 20.7%	3,283	11	\$949	726	\$796	16.6

LIFE CYCLE COST PRESENT VALUE

Option	Initial Cost	Utility Incentive	Annual Recurring Costs	Electricity Costs	Natural Gas Costs	Non Annual Recurring OM&R Cost	Replacem. Costs	Residual Value	Total LCC	Savings
Base	\$0	\$0	\$0	\$15,125	\$16,571	\$0	\$0	\$0	\$31,696	\$0
1	\$1,600	\$0	\$0	\$15,125	\$15,293	\$0	\$0	\$0	\$32,019	(\$323)
2	\$450	\$0	\$0	\$14,783	\$16,526	\$0	\$0	\$0	\$31,759	(\$62)
3	\$1,600	\$0	\$0	\$14,368	\$16,563	\$0	\$0	\$0	\$32,532	(\$835)
4	\$3,650	\$0	\$0	\$14,069	\$13,958	\$0	\$0	\$0	\$31,677	\$19

Study Parameters

Study Period: 20

years

Real Discount Rate: 3.0 %

☑ DOE/FEMP Escalation Rates

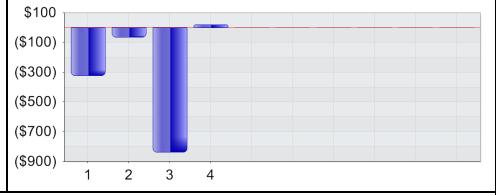
Region: Western US
Fuel Sector: Commercial

☐ Uniform Escalation Rates

EnergyLCC 5.1 by EnergySoft

Electricity: *N/A*Natural Gas: *N/A*





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